Subject: Re: Fwd: Re: Estimates of seed production per unit plant biomass?
From: Eric Seabloom <seabloom@umn.edu>
Date: 11/8/16, 1:25 PM
To: Elizabeth Wolkovich <lizzie@oeb.harvard.edu>

Hi Lizzie

I am still alive!

Sorry to be dreadful in getting you some seed data, but I have been super hectic and I haven't worked with these data much so they were a bit messy to assemble. In addition, all the work I had done about 12 years ago was in SAS, so I had some nostalgic times looking back at SAS code trying to figure out what I had done!

Anyway, I hope this will still be useful.

These data are from three experiments (Fire, Water, and Nitrogen) conducted in a grassland at Sedgwick Reserve near Santa Ynez, CA. The details are in the attached paper (Seabloom et al. 2003. PNAS).

Each experiment shares a core set of two treatments.
1. Starting plant community (Annual or Perennial Grass Dominated)
2. Reciprocal Seeding (Annual seed added to perennial community and perennial seed added to the annual community).

The experiment then differ in other treatments:
- Fire Experiment (Control or Burned Prior to Seeding)
- Nitrogen Experiment (Control or Nitrogen Addition)
- Water Experiment (Control, Watering, Gopher Exclusion, Watering and Gopher Exclusion).

I am attaching the seed data on the three annual grasses we tracked first (Hordeum murinum, Bromus hordeceus, Bromus madritensis). I will tackle the three perennial grasses next (Nassella pulchra, Elymus glaucus, Bromus carinatus). The annuals are a bit easier, as we just collected whole plants. For perennials, we could not really isolate individuals very well, so we have seed data on a per area basis.

Seed data are from annual grass individuals collected in each plot in each of 3 years. From these plants I could calculate seed mass per plant, number of seeds per plant, mass of a seed, seed mass to vegetative mass ratio etc. If there are other things you want, I might be able to extract them.

Abundance data is based on biomass samples sorted to species for 5 years of treatments. I added up the number of samples for the clipping and sorting, and it would equal a strip of biomass 10 cm wide and 1.3 km long. Geez.... this was a big project!

Here is a list of the attached files:
invade-exp-file-descriptions.xlsx - List of the variables in each file.

invade-exp-data-output-annual-seeds.csv - Annual seed data file

invade-exp-data-output-full-plant-biomass.csv - Biomass data sorted to species

invade-exp-data-output-taxa-table-biomass.csv - Lookup table for some basic information on each of the taxa

invade-exp-ann-seed-analysis.R - This file reads in the annual seed data and does some quick plots and analyses to give you a feel for the data.

I am trying to get this well documented enough to submit to Dryad, but I hope this is workable. I know it is a bit clunky now. If it is interesting for you but confusing, we could have a Skype call.

OK... I am going to open a bottle of wine and pray that the electorate at large is at least somewhat sane!

Sorry again for being dreadful. Now that I have blown off the dust from these data, I think I can get you the perennial grass seed data reasonably quickly.

Best!

Eric

On 8/23/16 2:59 PM, Elizabeth Wolkovich wrote:
> Hi Eric,
>
> Just sending a friendly pester on this! I thought of it as I was looking sideways at the current model output we have (and cursing my abilities to use lists in R).
>
> All the best,
> Lizzie
>
> On 6/27/16 11:02 AM, Eric Seabloom wrote:
> > Hey Lizzie
> >
> > I will boost it up my to do list and feel free to pester me as well!
> >
> > You did not come across poorly! I am super excited to get some of these data used. They were a pain to collect, and I have only used them extremely minimally.
> >
> > Cheers,
> >
> > Eric
> >
> > On 6/27/16 9:48 AM, Elizabeth Wolkovich wrote:
> > > Hi Eric,
> > >
> > > I hope this note finds all well with you. I am following up on the below email and wondering if you might be able to send parameter estimates some time in the next month or so? I realize it's summer and field season so crazy in its own ways. Feel free to tell me what's reasonable or impossible.
> > >
> > > I hope I didn't come across poorly below regarding authorship. If it would be better to talk by phone or Skype, just let me know.
> > >
> > > All the best,
> > > Lizzie

-------- Forwarded Message --------
Subject: Re: Estimates of seed production per unit plant biomass?
Date: Sun, 3 Apr 2016 11:07:31 -0400
From: Elizabeth Wolkovich <lizzie@oeb.harvard.edu>
To: Eric Seabloom <seabloom@umn.edu>

Hi Eric!

It would be great if you could share the seed mass and seeds per plant biomass for the 3 annual and 3 perennial species across N, H2O, and fire, and the effects of perennial competition on the annuals. That would be amazing! It would also be great to have the R* data if that's possible. I reached out to Stan about R* values and he mentioned a 6 times rejected paper by Parker (I am so sorry).

Thanks for the papers. I had looked at the Everard et al. recently but will check out Elizabeth's.

Would you like to be co-author on the possible papers for the data? The project has been developing with my collaborator on it, Megan Donahue, for 6 years now so I would need to talk with her first. We're actually hoping for two papers. One would be how to add phenological tracking and nonstationarity to community models and would be pretty general, searching lots of parameter space and trying not to be too system specific. After that we are keen to write another about drought dynamics and California invasions which would be very fun to have your input and co-authorship on. Let me know what you think.

All the best,
Lizzie

PS: Sent you a google drive link to the few photos I have from that trip in 2007.

On 4/1/16 4:07 PM, Eric Seabloom wrote:
> Ahhh.... send me more of those pictures!
>
> This sounds like an exciting project!
> I could definitely provide seed mass and seeds per plant biomass for these 3 annual and 3 perennial species. These estimates could include the effects of N, H2O, and fire, and the effects of perennial competition on the annuals.
>
> It is funny your wrote me about this coexistence question. I was just thinking about a project with Kat Shea to ask about coexistence using these seed data quite a while ago, and wondering if it was worthwhile trying to resuscitate. She started playing around with a Chesson-eque lottery kind of model, but it never went far and it is not on either of our agendas now.
>
> FYI, here are a couple modeling papers we did using some of these data

-- none of which overlap with your ideas at all. The 2007 PNAS paper is an integro-difference equation, so it might interesting for your as it has within and among season dynamics. The Everard paper looks at linkages between water and nitrogen limitation in these plots.

I could also provide you with R* data based on monocultures of these species where we measured above and belowground biomass, light, soil N, soil moisture, etc. This is a project I did with Stan and Sophie Parker, one of J. Schimel's students. Mostly it is in a dissertation now. Sophie is mostly doing management for the TNC and this paper suffered some pretty brutal reviews. I should probably revitalize it at some point.

Anyway, I'd be more than happy to help with any data I can provide that would help. I should check with Stan and Sophie about the monoculture data, but I doubt it would be a problem.

Cheers,

Eric

On 4/1/16 2:23 PM, Elizabeth Wolkovich wrote:

> Hi Eric,
>
> This is great! And amazing and rare (at least from my literature search,
> which I have been working on for a while). Please publish these!
>
> What I am trying to do is parameterise a multi-year model of a coexisting plant community where within-year dynamics are described by Rstar (I have some estimates of these for moisture and N for some California species from Janneke's work and others) and between year dynamics include the storage effect model. In case it helps I have attached the model info from my notes.
>
> What I ideally need is:
> - biomass per seed at the start of the growing season (b_0 in the attached pdf, I have the info from Table 1 in your 2003 PNAS paper)
> - seeds per plant biomass at the end of the growing season (to calculate
> phi in the attached pdf)
>
> It seems like you might have this for annuals but not perennials? Both would be great as once we get the model running and understand its dynamics a little I did plan to use it to look at invasions in drought conditions but data for just annuals would help much.
>
> Knowing how much the estimates vary across treatments -- especially water addition since we plan to vary the water pulse dynamics in the model -- would be good so we can use those values to help bracket the parameter space we search.
>
> I also need estimates of any loss due to overwintering and % germination

> > > > success, though neither of these is as critical and for % germination we
> > > > have estimates from Oscar Godoy's work.
> > > >
> > > > It would be super cool to compare the curves we get from the model with
> > > > your seasonal growth rates! But that might be another project in and of
> > > > itself. Maybe something we could collaborate on once I have the model up
> > > > and running if you're interested?
> > > >
> > > > Middle school and third grade, that seems impossible. Marjorie is still
> > > > this age in my head (attached), I don't even think she should be
> > > > walking, let along attending the third grade.
> > > >
> > > > Many thanks!
> > > > Lizzie
> > > >
> > > > On 4/1/16 2:01 PM, Eric Seabloom wrote:
> > > >> Seed data? I am up to my eyeballs in unpublished seed data from that
> > > >> experiment!
> > > >>
> > > >> We put so much into counting and weighing seeds and I have just never
> > > >> done much with it. I am also on a bit of a campaign to publish some
> > > >> older data sets, so this could be a good excuse to get this one pulled
> > > >> together. I just finished putting together all the plant cover and
> > > >> biomass data from these experiments.
> > > >>
> > > >> Can you tell me a little more detail on what you need?
> > > >>
> > > >> I should be able to provide seeds per m2 for 3 perennial (Elymus
> > > >> glaucus, Bromus carinatus, and Nassella) and 3 annual (Hordeum
> > > >> marinum, Bromus madtritensis, and Bromus hordeaceus) grasses.
> > > >>
> > > >> Specifically, I should mostly have the following:
> > > >> - Individual Seed Mass
> > > >> - Individual Plant Mass (Annuals)
> > > >> - Seeds per plant (Annuals)
> > > >> - Seeds per inflorescence (Perennials)
> > > >> - Plant mass per m2
> > > >> - Inflorescences per m2 (Perennials)
> > > >>
> > > >> All of these data would include effects of N addition, Water addition,
> > > >> and burning across multiple years.
> > > >>
> > > >> If you are interested in phenology, I might be able to dig up light
> > > >> interception through the growing season for about 20 CA species in
> > > >> monoculture, which could give seasonal growth rates. I would have to
> > > >> dig for this a bit and no guarantees.
> > > >>
> > > >> All is well here. Liam is in Middle School which seems crazy.

Marjorie
is in 3rd grade. We live about 20 minutes from my sister and her kids and my parents, and I am happy that the kiddos get to have grandparents, cousins, and an Aunt and Uncle close by.

Best to you as well!

Eric

On 4/1/16 10:50 AM, Elizabeth Wolkovich wrote:

> Hi Eric,
>
> Greetings from windy Boston! Where biking is most treacherous from the
> wind+crazy driver combo. I hope this note finds all well with you. I wonder if you guys are expecting the same series of clippers that is supposed to sweep through here for the weekend.
>
> Anyway, I am writing with a query. I am working on a model that incorporates phenology and am the stage of tracking down reasonable parameter estimates. I have a few from your 2003 PNAS paper but am stuck
> on finding an estimate of biomass to seed conversion (i.e., per unit of
> plant biomass how many seeds are produced?). I don't think this is in
> your 2003 paper but I was wondering if you perhaps published the data in
> another paper or have some estimates of plot biomass per species and seed production per species together that I could use to estimate it?
>
> I realize it is a pain to sift out old data so if it something you simply don't have time for I completely understand but if you have any
> ideas please send them along! I can offer something in return like phenology data or my baseline stan-modeling skills....
>
> All the best,
> Lizzie

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Attachments:

invade-exp-file-descriptions.xlsx	49.7 KB
invade-exp-ann-seed-analysis.R	5.2 KB
invade-exp-data-output-annual-seeds.csv	99.9 KB
invade-exp-data-output-full-plant-biomass.csv	422 KB
invade-exp-data-output-taxa-table-biomass.csv	4.7 KB
seabloom-etal-2003-pnas.pdf	413 KB