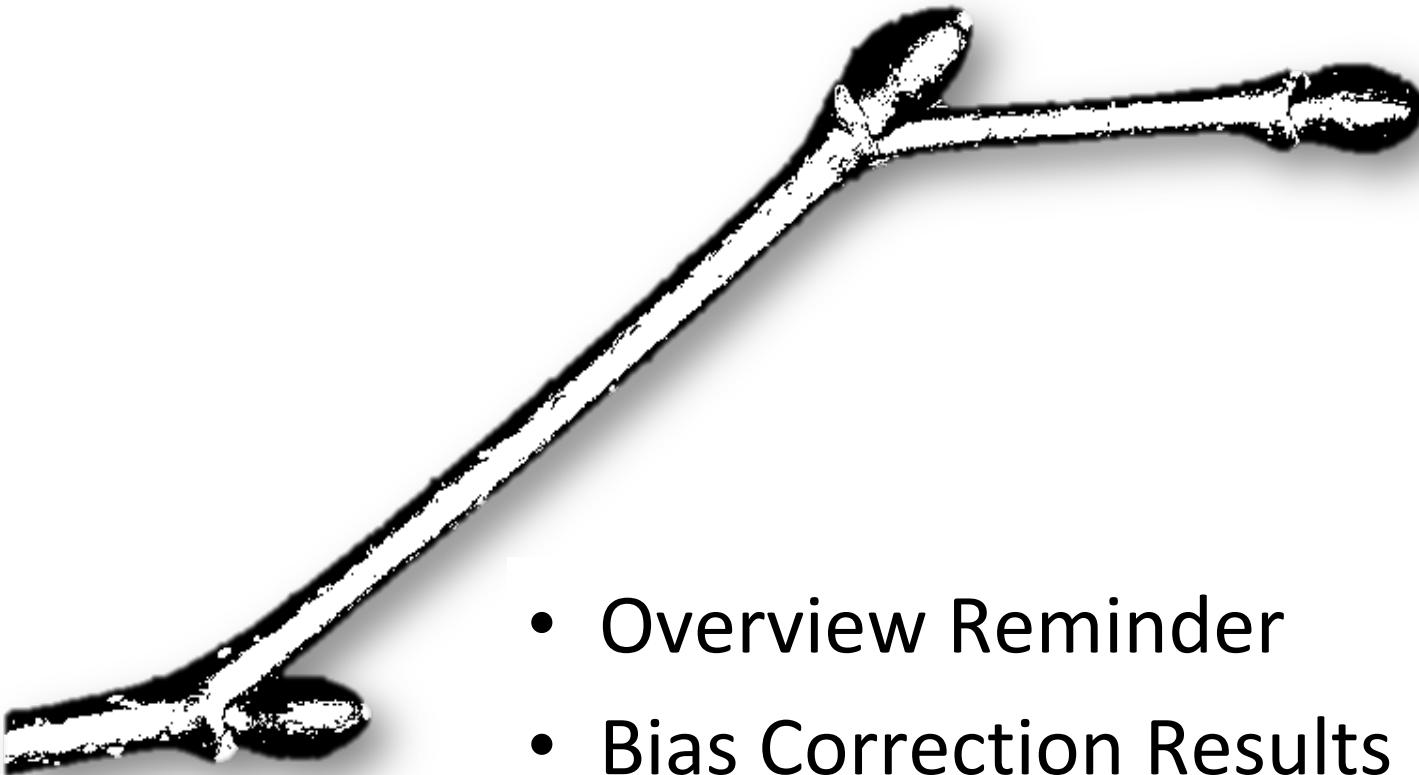


If I could measure 6000 buds in a day:  
*A statistical story of temporal bias correction  
and the phenology that went with it*



- Overview Reminder
- Bias Correction Results
- Bonus: A bad model of bud burst



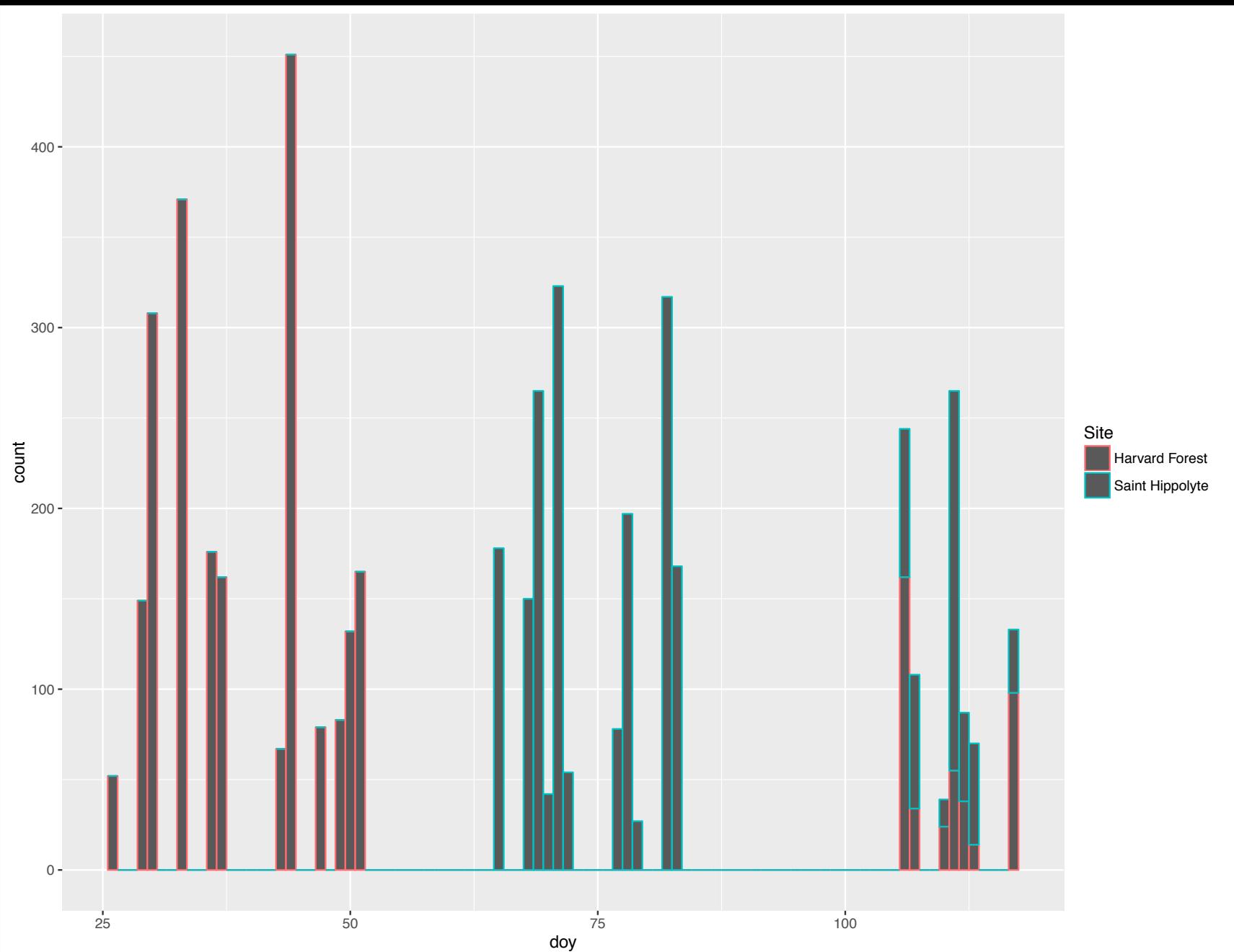
Data set 1:

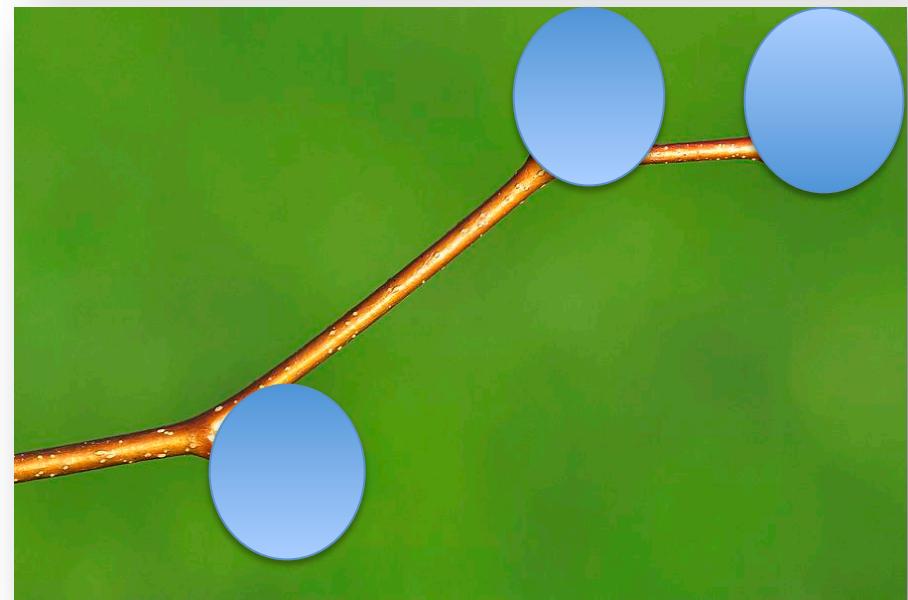
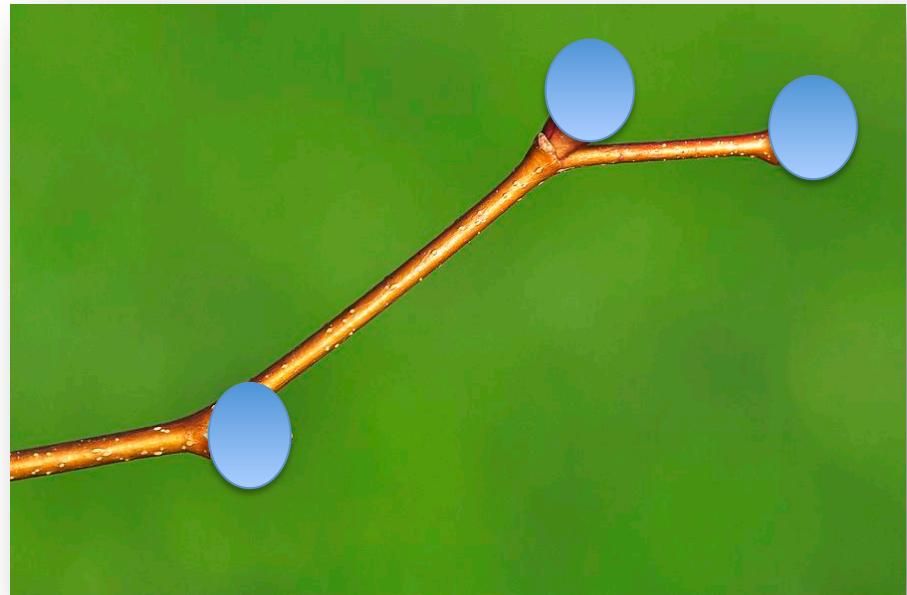
6467 rows of bud volume  
27 species (6 reps/species)  
2 sites  
(bud level)

Data set 2:

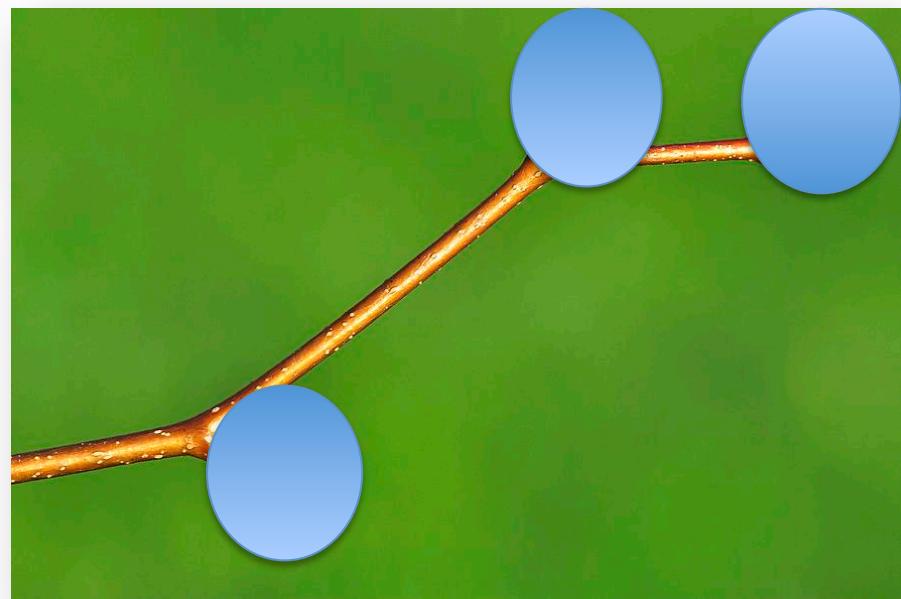
2136 rows phenological  
observations  
12 experimental treatments  
(twig level)

**Does bud size predict phenological order?**  
**Hypothesis: Larger buds burst earlier**





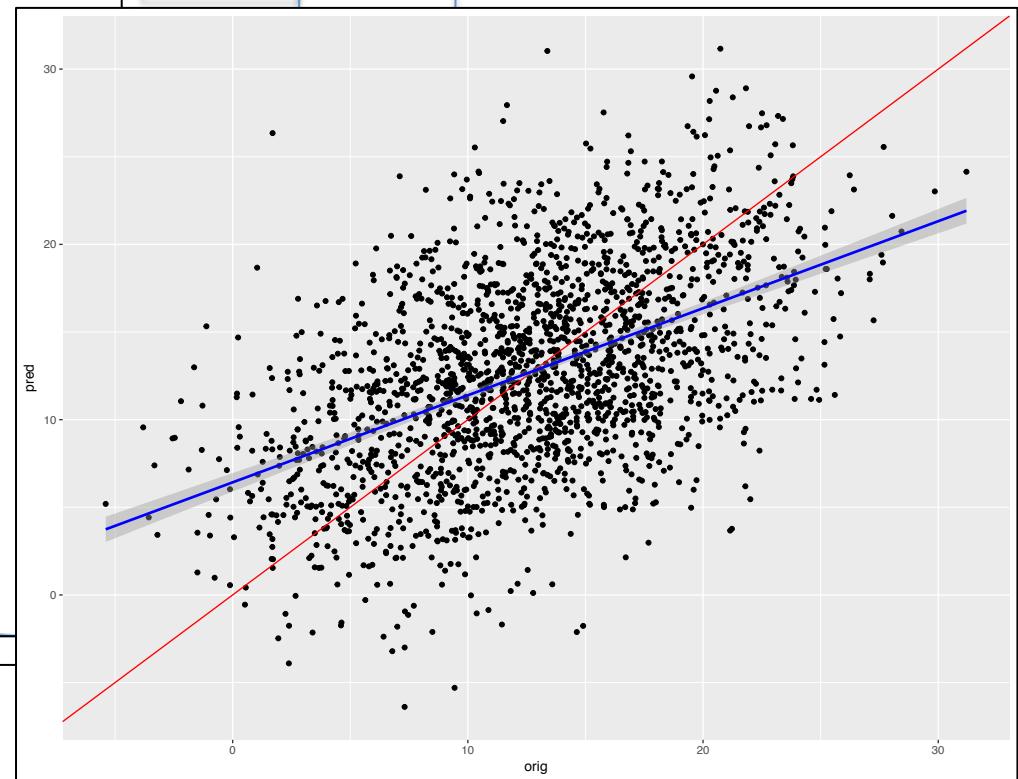
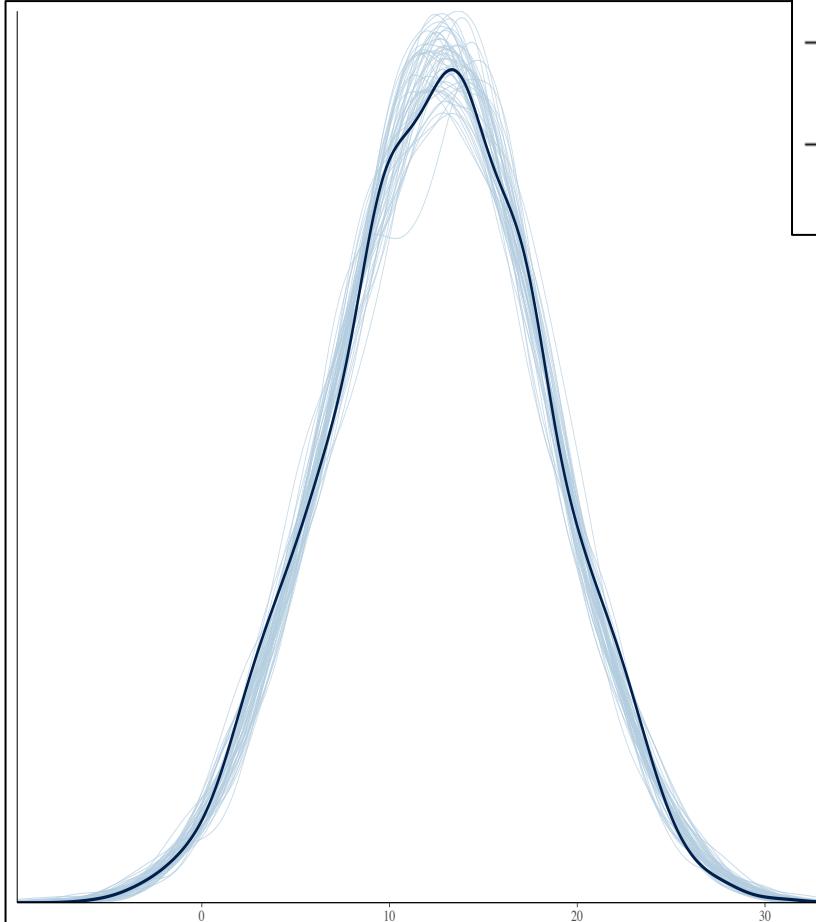
T1



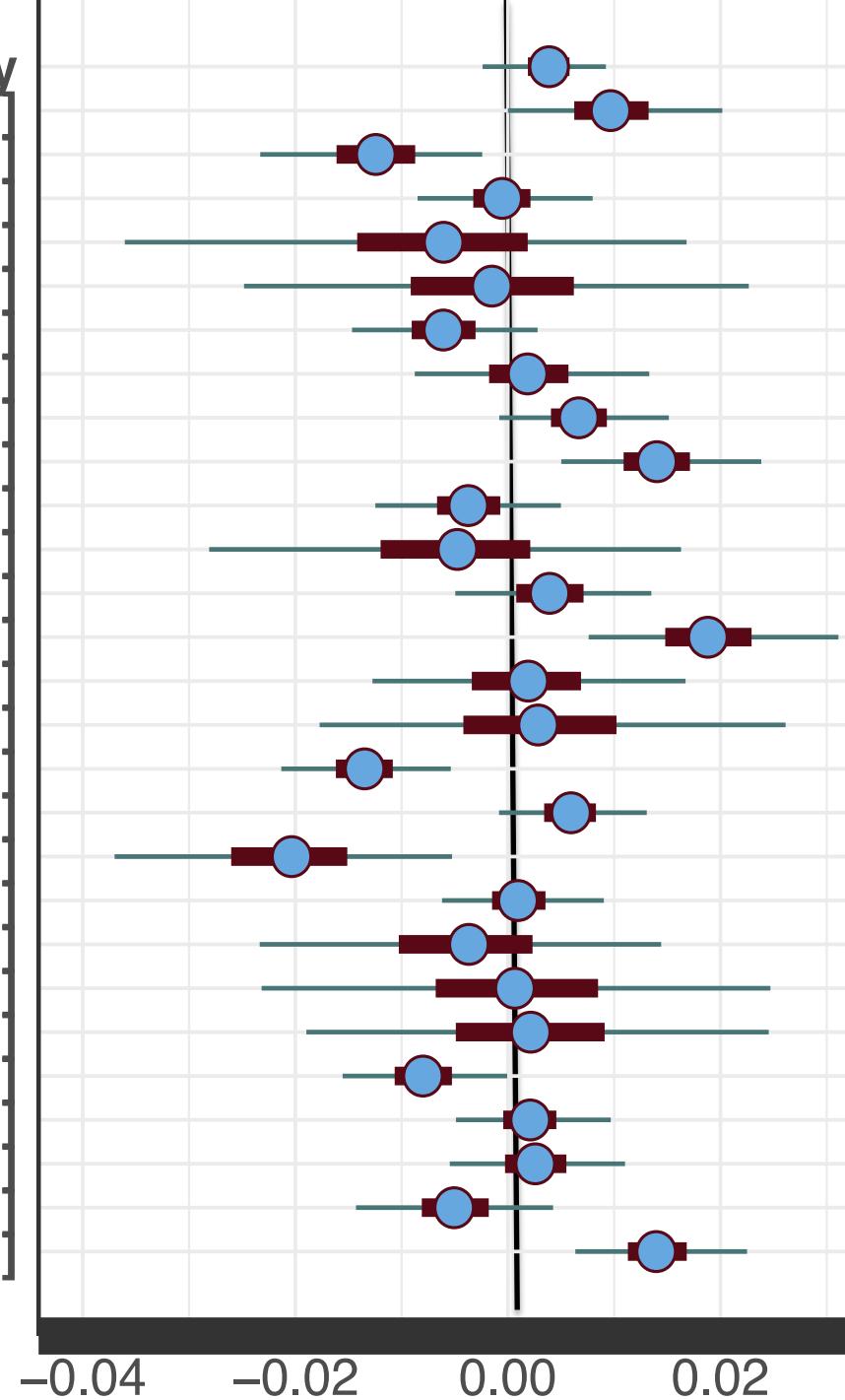
T2

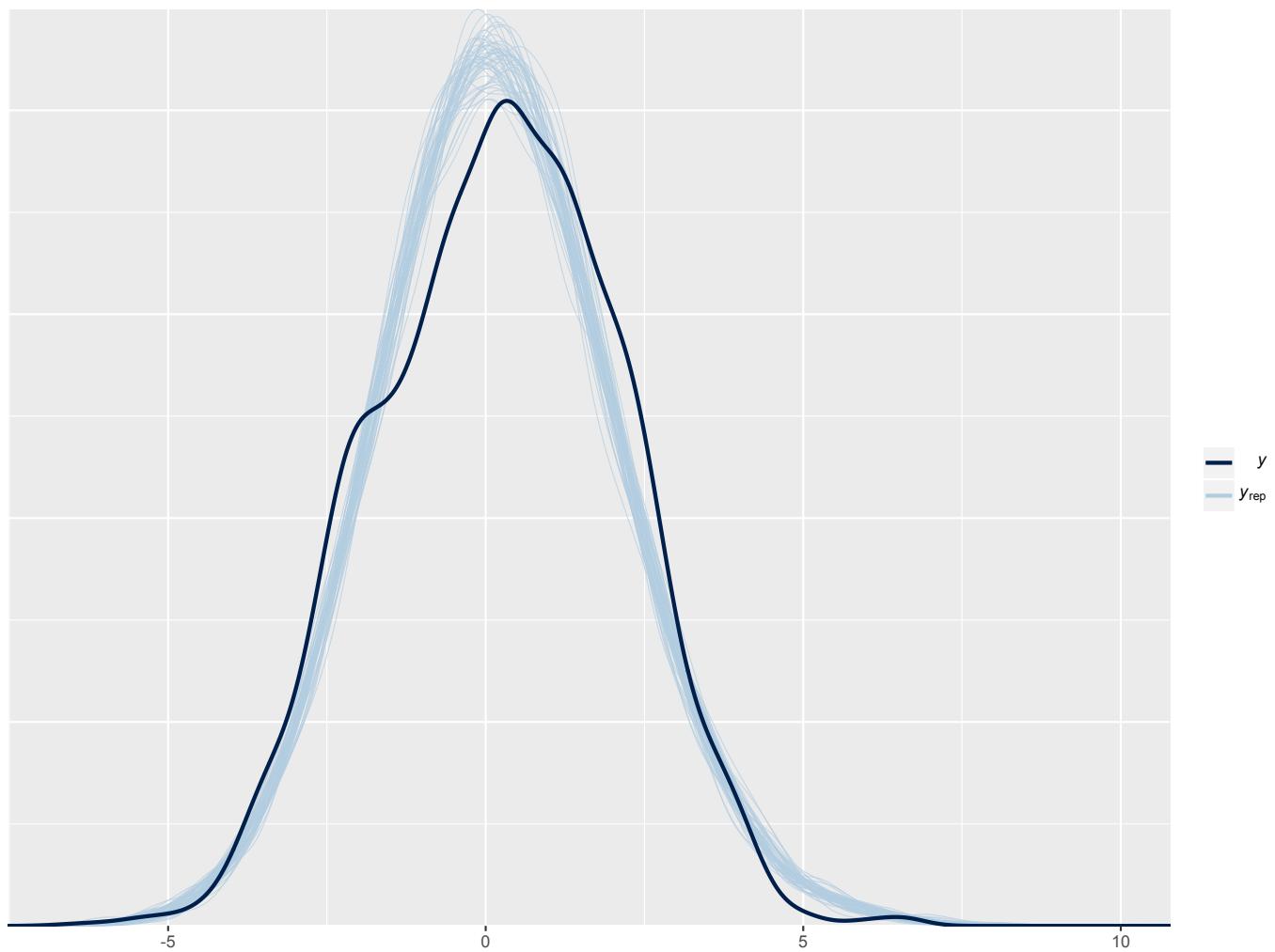
```
truvol.slope<-brm(bvol~doy+(doy|sp), testdat2)
```

	Actual	Median	MAD SD	CI <sub>5</sub>	CI <sub>95</sub>
Intercept	8	8.3	1.4	5.99	10.67
doy	0.1	0.1	0.0	0.0337	0.159
sigma	4	4.1	0.1		

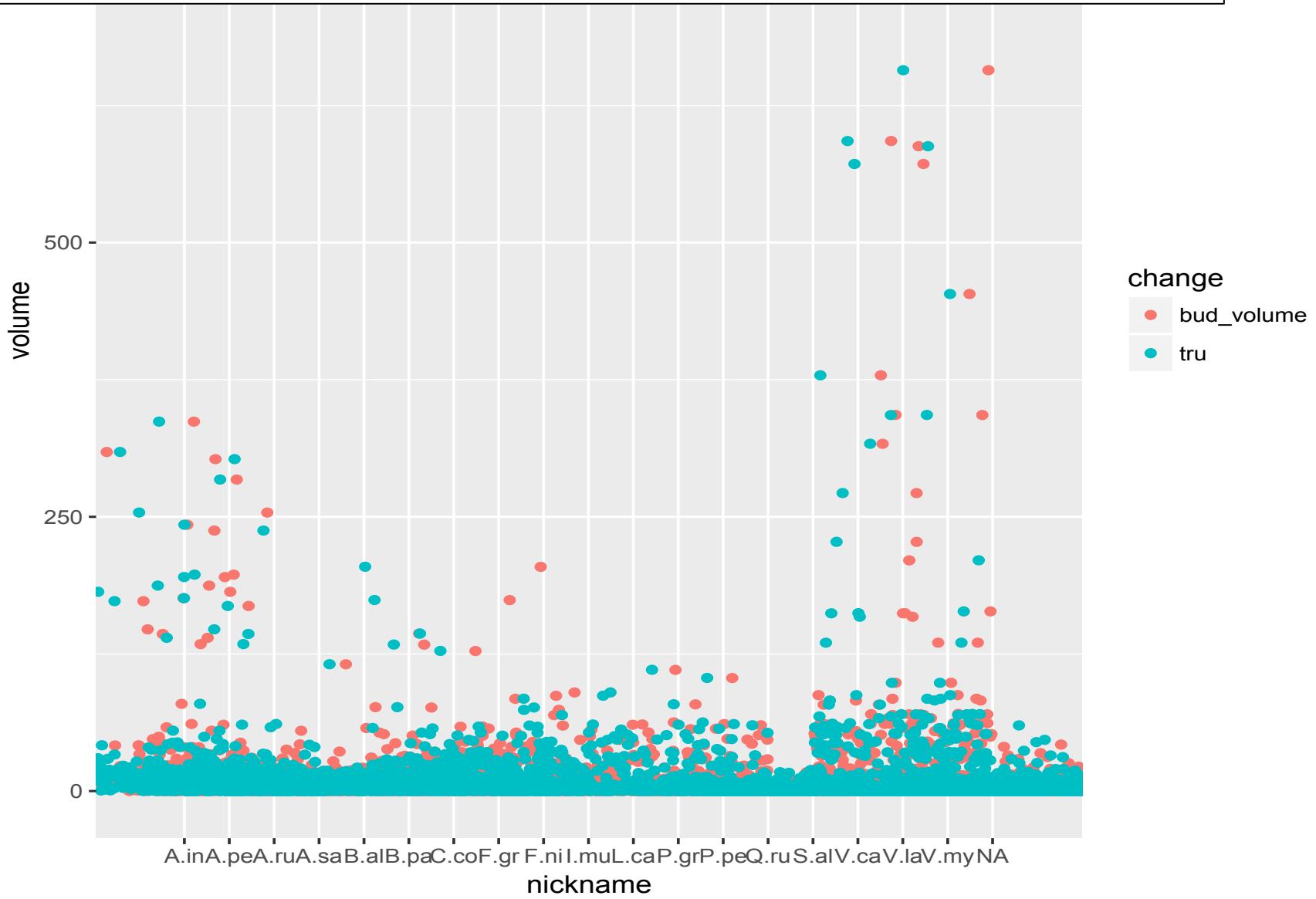


doy  
b[doy name:*Acer pensylvanicum*]  
  b[doy name:*Acer saccharum*]  
    b[doy name:*Alnus incana*]  
  b[doy name:*Aronia melanocarpa*]  
b[doy name:*Betula alleghaniensis*]  
  b[doy name:*Betula lenta*]  
  b[doy name:*Betula papyrifera*]  
    b[doy name:*Corylus cornuta*]  
  b[doy name:*Fagus grandifolia*]  
    b[doy name:*Fraxinus nigra*]  
b[doy name:*Hamamelis virginiana*]  
  b[doy name:*Ilex mucronata*]  
b[doy name:*Lonicera canadensis*]  
  b[doy name:*Lyonia ligustrina*]  
    b[doy name:*Nyssa sylvatica*]  
b[doy name:*Populus grandidentata*]  
b[doy name:*Prunus pensylvanica*]  
  b[doy name:*Quercus alba*]  
  b[doy name:*Quercus rubra*]  
  b[doy name:*Quercus velutina*]  
b[doy name:*Rhamnus frangula*]  
b[doy name:*Rhododendron prinophyllum*]  
  b[doy name:*Spiraea alba*]  
b[doy name:*Vaccinium myrtilloides*]  
b[doy name:*Viburnum cassinoides*]  
b[doy name:*Viburnum lantanoides*]  
  b[doy name:*Acer rubrum*]





$$\text{True}_{\text{budvolume}} = \text{measured}_{\text{budvolume}} - \beta_{[i]} * (\text{measured}_{\text{day}} - 40)$$



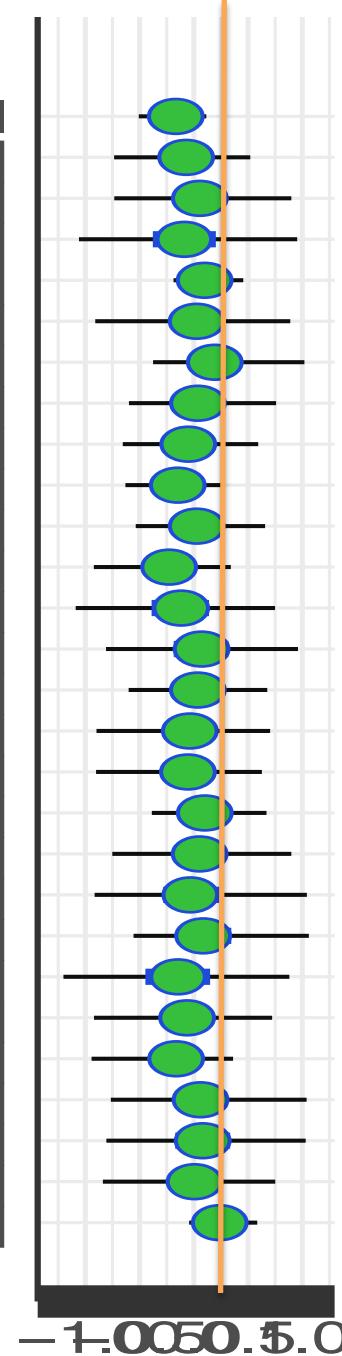
## Bonus Model!

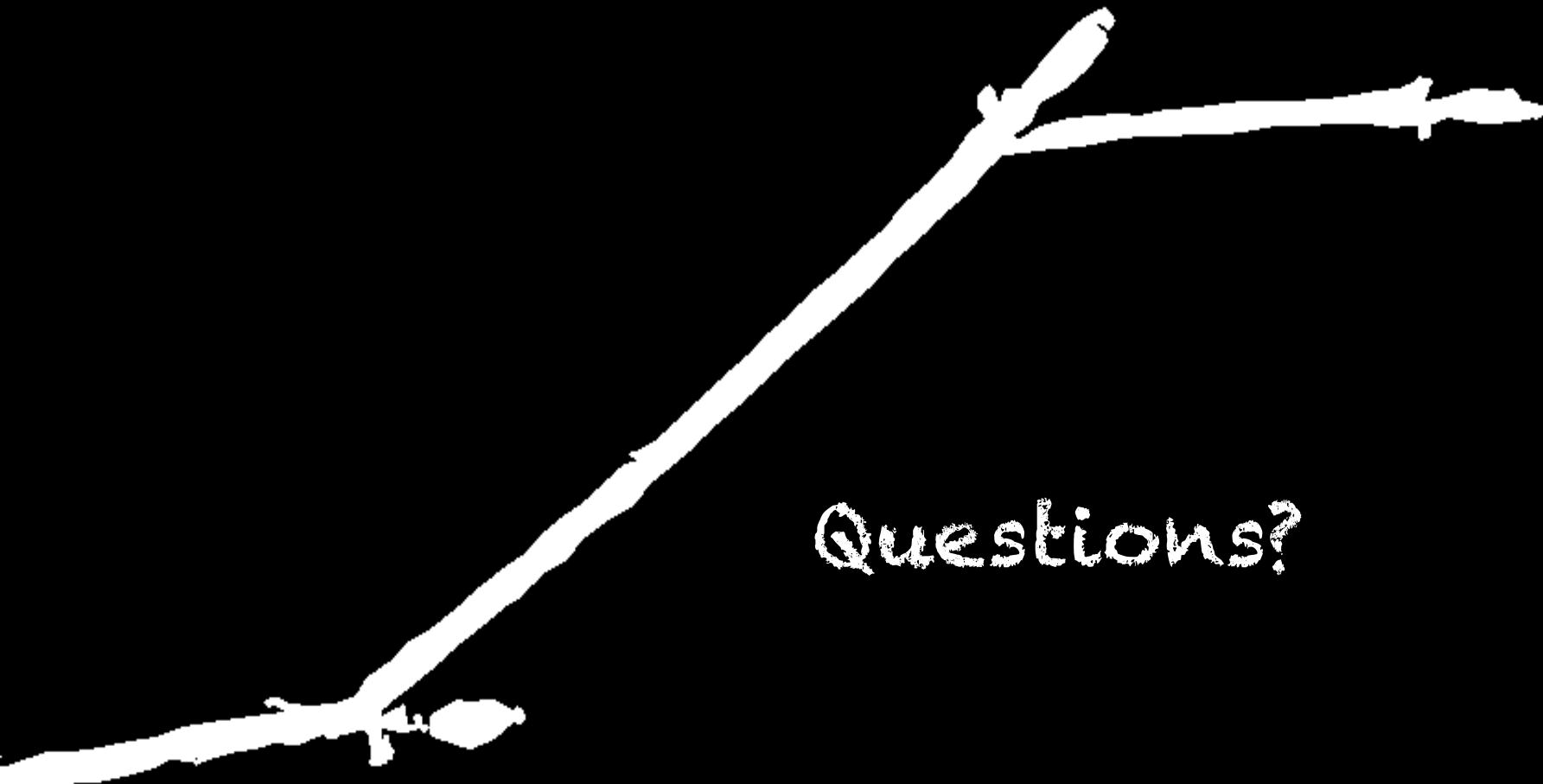
- Response: Mean days to budburst for each individual tree in phenological dataset
- Predictors: Mean stem diameter and (corrected) bud volume for each individual tree in bud measurement data

---

```
moodle<-stan_glmer(meanbday ~ meanstemdiam + meanbvol + (meanstemdiam+meanbvol|SP))
```

meanbvol  
b[meanbvol SP:ACEPEN]  
b[meanbvol SP:ACERUB]  
b[meanbvol SP:ACESAC]  
b[meanbvol SP:ALNINC]  
b[meanbvol SP:AROMEL]  
b[meanbvol SP:BETALL]  
b[meanbvol SP:BETLEN]  
b[meanbvol SP:BETPAP]  
b[meanbvol SP:CORCOR]  
b[meanbvol SP:FAGGRA]  
b[meanbvol SP:FRANIG]  
b[meanbvol SP:HAMVIR]  
b[meanbvol SP:ILEMUC]  
b[meanbvol SP:LONCAN]  
b[meanbvol SP:LYOLIG]  
b[meanbvol SP:NYSSYL]  
b[meanbvol SP:POPGRA]  
b[meanbvol SP:PRUPEN]  
b[meanbvol SP:QUEALB]  
b[meanbvol SP:QUERUB]  
b[meanbvol SP:QUEVEL]  
b[meanbvol SP:RHAFRA]  
b[meanbvol SP:RHOPRI]  
b[meanbvol SP:SPIALB]  
b[meanbvol SP:VACMYR]  
b[meanbvol SP:VIBCAS]  
b[meanbvol SP:VIBLAN]





Questions?