**Introduction**

1. Evolvability is an important concept for understanding directions of morphological change through time
   1. If don’t know selection regimes, want to know how much variation alone can explain
   2. Houle has shown that just knowing G predicts the direction of G (no fossils though)
2. The modern quantification of evolvability is done using G matrices
   1. It is difficult to get the G matrix, very data intensive and requires breeding studies
   2. P matrix may substitute
      1. As proposed by Cheverud
   3. P has been examined in the past by Hunt, works!
   4. Still, don’t know how representative P is of G
      1. Cheetham and Porto et al showed pooled G works
3. Want to know how these things change through time: how G changes though time, how P relates to G through time
   1. Why is looking at this through time an important concept??
      1. In which direction in phenospace is evo easy to explore; so if it doesn’t explore
      2. Expect to change in direction of Gmax or higher than average evolvability; if G didn’t change then maybe constraints
   2. To do so, need to be able to estimate G through time, which is difficult because don’t have known breeding populations millions of years ago
4. Can use bryozoans to address this!
   1. Clones, so all variation in P is due to E, not G
   2. Have a fossil record through time
   3. Specficially *Steginoporella magnifica*
      1. Simple system
5. Specifically, we ask:
   1. How well does P represent G?
   2. Does G change through time?
   3. Does P align with G max?
   4. Is P changing in directions of above average evolvability?