

## Week 7 Constraints Discussion Questions:

Salazar-Ciudad and Marín-Riera:

1. Is it more useful to look at phenotype or functional properties when determining if the adaptive peak was reached? Which approach would be more applicable in a natural study?
2. How might the results of this study have been different if ecology was taken into account?
3. Are you convinced that their model is a realistic simulation applicable to the natural world?
4. What is the overall take-home message that comes from the results of this study?

Chitwood *et al.*:

5. How might development be altered if auxin was expressed equally in both sides of the primordium?
6. Why are these plants constrained to an asymmetric expression of auxin?
7. Auxin is involved in many developmental processes in plants. What other constraints might the asymmetrical expression of auxin cause?
8. Would Salazar-Ciudad and Marín-Riera consider this an example of an organism that is constrained from reaching its optimum morphology?

de Bakker *et al.*:

9. What could be a reason as to why adult digit I is under weaker constraints and adult digit V is under stronger constraints?
10. Why do you think the patterns of digit loss are different among different tetrapod taxa?
11. What might explain the differences between the adult and embryonic phenotypes of digit expression?
12. In which taxa are selection pressures stronger than constraints? In which taxa are constraints stronger than selection pressures? What does this tell us about the expression of wing digits I and V in these taxa (figure 4b)?