**Leafhopper Migration**

<https://aeroecology.shinyapps.io/Birds_Bugs_and_Phenology/>

**Setting up the model for Lesson 1 Extend**

* **Show/hide Data**
	+ Have students toggle on the “Show State Abbreviations” button.
	+ They can ignore the temperature data for now, so they should leave the temperature colors and numbers toggled off (this is the default setting already).
* **Select states for first arrival plot**
	+ This shows students what day of the year leafhoppers were found in a state for every year there is data available. They can select more than one from the list.
* **Display data for individual states or means**
	+ “Show States” is the default and most straightforward graph to interpret. It will create a line for arrival date (see previous section) for each state selected.
	+ “Show Means” will show the average day leafhoppers were found across all the states students have selected. It is a little less obvious to interpret but will show overall trends of arrival over time across the entire range students have selected.
* **Recommended data ranges**

**Troubleshooting tips for using the model**

* If the model is refreshing slowly for students, have them work in groups of 2-3 per device to reduce the strain on the program.
* After moving a slider, wait until the map(s) update before making other changes to the variables.
* Avoid the play button (small triangle at the right end of the Day of Year sliders) if you have a large class and/or the model is refreshing slowly.