LEAFHOPPER MIGRATION GUIDE

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

Setting up the model for Leafhopper Migration (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.
  - The graph will show one dot for each year in which data were collected.
  - Note that the y-axis does not begin at 0 because no insects were detected before day 100.
- 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.
- 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.

Recommended date ranges

Change in one state over time		Change across states over time	
States w/ most data	**Year range**	**Years w/ most data**	**# of states**
WI	1951-2012	1988	14
IL	1952-2012	1991-1992	14
MN	1952-2011	1990	13
MD	1955-2012	1954	12
PA	1955-2012	1985	9
MI	1953-2004	2010-2011	6
OH	1952-1997		
OK	1952-1997		
MO	1952-1995		

Aeroecology. (n.d.). Birds, bugs, and phenology [Interactive data visualization]. Shiny Apps. https://aeroecology.shinyapps.io/Birds_Bugs_and_Phenology/