Name_____

DATA Nugget

Do invasive species escape their enemies?

Featured scientist: Elizabeth Schultheis from Michigan State University

Research Background:

Invasive species, like zebra mussels and garlic mustard, are species that have been introduced by humans to a new area. Where they invade they cause harm. For example, invasive species outcompete native species and reduce diversity, damage habitats, and interfere with human interests. Damage from invasive species costs the United States over $100 billion per year.

Scientists want to know, what makes an invasive species become such a problem once it is introduced? Is there something that is different for an invasive species compared to native species that have not been moved to a new area? Many things change for an invasive species when it is introduced somewhere new. For example, a plant that is moved across oceans may not bring enemies (like disease, predators, and herbivores) along for the ride. Now that the plant is in a new area with no enemies, it may do very well and become invasive.

Scientists at Michigan State University wanted to test whether invasive species are successful because they have escaped their enemies. They predicted invasive species would get less damage from enemies, compared to native species that still live near to their enemies. If native plants have tons of insects that can eat them, while an invasive plant has few or none, this would support enemy escape explaining invasiveness. However, if researchers find that native and invasive species have the same levels of herbivory, this would no support enemy escape. To test this hypothesis, a lab collected data on invasive and native plant species in Kalamazoo County. They measured how many insects were found on each species of plant, and the percent of leaves that had been damaged by insect herbivores. The data they collected is found below and can be used to test whether invasive plants are successful because they get less damage from insects compared to native plants.

Scientists at Michigan State University collecting data on invasive and native plant species, such as the number of insects found on each plant and the percent of leaves damaged by insect herbivores.

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Scientific Question: How does insect herbivore damage and insect herbivore numbers compare for native and invasive plants? Are invasive species successful because they have escaped insect herbivores?

What is the hypothesis? Find the hypothesis in the Research Background and underline it. A hypothesis is a proposed explanation for an observation, which can then be tested with experimentation or other types of studies.

Scientific Data:

Use the data below to answer the scientific question:

Scientific Name	Species Status	Average number of insects per plant	Percent leaves with damage from insect herbivores
Trifolium repens	invasive	0.09	67.5
Silene latifolia	invasive	0.08	33.9
Daucus carota	invasive	0	13.3
Robinia pseudoacacia	invasive	0.57	86.3
Dianthus armeria	invasive	0.03	34.7
Hieracium caespitosum	invasive	0.06	27.2
Stellaria graminea	invasive	0	8.3
Rumex acetosella	invasive	0	47.5
Chenopodium album	invasive	0	0
Phleum pratense	invasive	0.06	29.1
Danthonia spicata	native	0	10.4
Apocynum cannabinum	native	0	21.6
Hieracium gronovii	native	0	20
Lespedeza capitata	native	0.08	66.7
Ambrosia artemisiifolia	native	0	40.5
Vitis riparia	native	0	100
Monarda fistulosa	native	0	30.5
Antennaria parlinii	native	0	17.7
Euphorbia corollata	native	0	8.3
Asclepias tuberosa	native	0.8	11.6

Average for Invasive		
Average for Native		

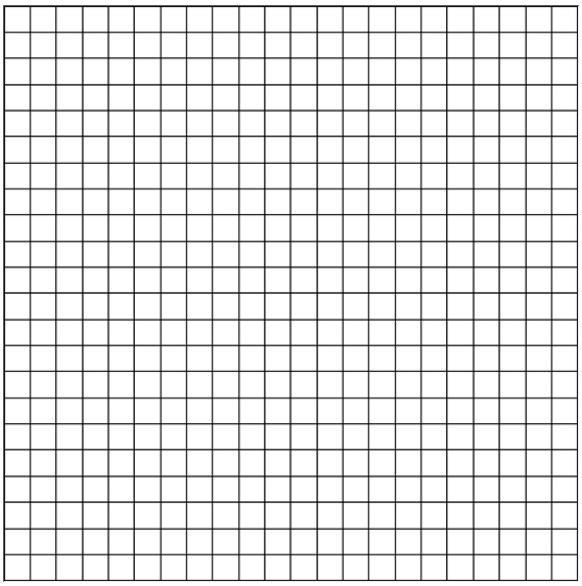
What data will you graph to answer the question?

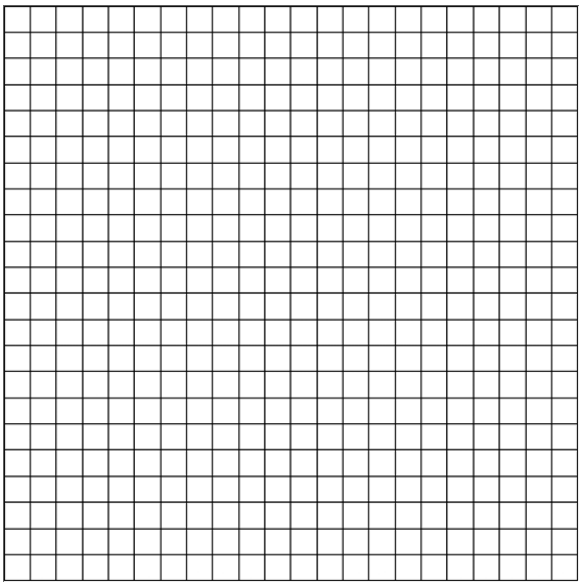
Predictor variable: _____

Response variables: _____

Name_____

Graph the data below:





Interpret the data: Make a claim based on the evidence that helps answer the original research question. Connect the pattern in the data to a pattern in the natural world. Justify your reasoning using data.

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Your next step as a scientist: Science is an ongoing process. Did this study fully answer your original question? What new questions do you think should be investigated? What future data should be collected to answer them?