

DATA *Nugget*

Grass grows where giants fall

Featured scientists: Ryan Helcoski (he/him) from Utah State University and Ndzalama Mkansi (he/him) from South African National Parks

Research Background:

When an animal dies, it might seem like the end of its story. But in nature, death can be the beginning of something new. Dead plants and animals slowly break down over time. As they decompose, their matter is recycled back into the ecosystem. Microbes, insects, scavengers, soil, and plants all help break down the remains and use the nutrients.



The site of an elephant carcass that has decomposed.

Recycling matter is especially important when the dead animal is as big as an elephant! An African bush elephant can weigh several thousand kilograms. That is bigger than most vehicles. When an elephant dies, its dead body, called a **carcass**, does not just disappear. Even though scavengers and predators eat a lot of the carcass, they still leave behind pieces that are harder to digest.

For years, Ryan and Ndzalama worked together in Kruger National Park, South Africa. They studied decomposition cycles at sites that had an elephant carcass. They met while studying elephant behavior around carcass sites in the park. Together, they set up cameras and watched as elephants spent time at these sites and noticed how the sites changed over time. They observed that elephant carcasses can change the plant community around it for years. This might be because nutrients from the carcass can move into the soil and eventually become part of new plant growth. Ryan and Ndzalama thought that elephant carcasses could create pulses of intense nutrients that previously limited grass growth at the site. They predicted there would be more grass growing close to the carcass than farther away.

They worked in Kruger, a savanna ecosystem that also has many other large animal species. Plains zebra, African buffalo, blue wildebeest, impala, and white rhinos all live there. These animals, and many others, are **grazers**, meaning they mostly eat grass.

Ryan and Ndzalama realized that to measure grass growth in a place with so many grazers would be difficult. The animals could eat the grass before the researchers can collect data. So, together with an international team, they figured out a way to keep the grazers out.

To start, they chose sites throughout the park where an elephant carcass had been decomposing for about 6 months. The carcass had mostly disappeared, and grass had begun to grow around a barren area of soil in the center. At these sites, they built small 1 m² cages called **exclosures**. An exclosure keeps large grazing animals out, but still lets sunlight and rain reach the grass. They set up exclosures at several distances from the carcass site: 2.5 meters (m), 5 m, 10 m, and 15 m. They also paired an open plot, or **control**, next to each exclosure where animals could graze normally. For each distance, they set up 14 replicates.

At the start of their study, they clipped all the grass down to the dirt. This way, all plots started with grass at the same height, and they only measured grass that grew during their study. Then, they let the grass grow for a full season. At the end of the growing season, they clipped and weighed the grass from each plot to measure **dry biomass**, or the mass of dried plant material. For analysis, they averaged the results from the 14 replicates of each treatment and distance.



Ndzalama inside one of the exclosure treatment plots.

Scientific Question: How does distance from an elephant carcass affect grass regrowth and grazing in an African savanna?

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:

Name _____

Use the data below to answer the scientific question:

Distance from carcass center (m)	Exclosure Average grass biomass (kg/m ²)	Control Average grass biomass (kg/m ²)
2.5	0.48	0.34
5	0.47	0.32
10	0.38	0.27
15	0.33	0.27

**Data represent the averages of the 14 replicate sites for each distance and treatment.*

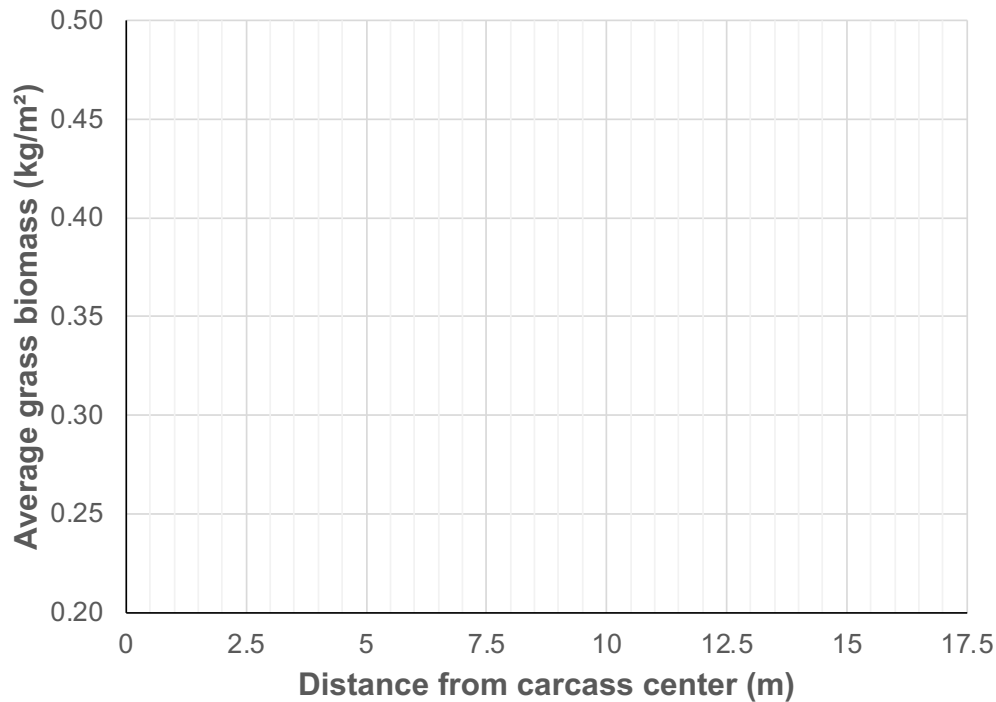
What data will you graph to answer the question?

Independent variables: _____

Dependent variable: _____

Name _____

Draw your graph below: Identify any changes, trends, or differences you see in your graph. Draw arrows pointing out what you see and write one sentence describing what you see next to each arrow.



Interpret the data:

Make a claim that answers the scientific question - How does distance from an elephant carcass affect grass regrowth and grazing in an African savanna?

What evidence was used to write your claim? Reference specific parts of the table or graph.

Name_____

Explain your reasoning and why the evidence supports your claim. Connect the data back to what you learned about the role of grazers in the savanna ecosystem.

Did the data support Ryan and Ndzalama's hypothesis? Use evidence to explain why or why not. If you feel the data are inconclusive, explain why.

Your next steps as a scientist: Science is an ongoing process. What new question(s) should be investigated to build on Ryan and Ndzalama's research? How do your questions build on the research that has already been done?