

HS Desert Tortoise Literature Dive Lesson Plan

At a Glance

Students practice reading scientific articles to better understand the current scientific research related to the desert tortoise.

Advance Preparation

- Decide how you want students to view articles (on a computer/tablet or printed out).
- Follow the link below to an infographic on how to read a scientific paper. Decide whether you will have your students read the infographic individually or go through it as a class.

<https://www.elsevier.com/connect/infographic-how-to-read-a-scientific-paper>

Objectives

- Learn the process of reading a scientific article
- Learn how to pull out relevant information from scientific articles to share with others

Materials

- PDF's of articles for each student to read
- "Check for Understanding" questions for each student (online or print-out)

Lesson

- Introduce your students to the process of reading a scientific paper utilizing the infographic provided or any other documents that you find helpful.
- Provide your students with the two articles related to the desert tortoise, starting with the Pre-Lesson Article.
- There are vocabulary words provided in the Teacher Overview section. You can introduce them before or after students read the articles, whenever you feel it fits best in the lesson for your students.
- Provide each student with the "Check for Understanding" questions. These questions could be done while reading the article (worksheet style) or after students are done reading the articles (quiz style). We suggest going through the "Check for Understanding" questions as a class after students have completed individually to see if there are any concepts in the questions that need more clarification.

Teacher Overview

Pre-Lesson Article: Germano et al. (2014) Impacts of upper respiratory tract disease on olfactory behavior of the Mojave Desert tortoise.¹

KEY POINTS:

In this article, Germano et al. discuss the implications of upper respiratory tract disease (URTD) in desert tortoises as well as the importance of taking such disease into account when considering how to recover the species. They tested the olfactory response of tortoises exhibiting signs of URTD. They tested tortoise olfactory response to different food smells and determined that the presence of nasal discharge and other clinical signs of the illness did in fact reduce their ability to find food. The authors discuss the fact that turtles and tortoises are known to use olfactory cues to identify food, predators, and conspecifics and that URTD can negatively impact not only physical wellbeing but also general survival. Additionally, in the long-term reduced well-being and loss of olfactory cues may result in reduced fecundity, may contribute to allele effects in small populations, and can result in early death. Interestingly, increased nasal discharge did not reduce appetite, but did reduce the tortoise's ability to distinguish suitable food sources.

This article is best for the HS level of DTSE, but could be adapted for MS level. The article explains why URTD caused by the *Mycoplasma agassizii* bacteria is so dangerous to tortoises. This article also reiterates that URTD is not just a "tortoise cold," but rather a very serious illness that affects tortoise populations and individual wellbeing in several ways.

Vocabulary:

- Olfactory - relating to the sense of smell³
- Fecundity - the ability to produce an abundance of offspring or new growth; fertility³
- Conspecifics - (of animals or plants) belonging to the same species³
- Pathogenic - (of a bacterium, virus, or other microorganism) causing disease³

Check for Understanding Questions: (Answers are bolded for teacher reference)

- I. What species of bacteria commonly causes URTD?
 - A. Pseudomonas
 - B. Mycoplasma agassizii**
 - C. Aeromonas
 - D. Cutaneous dyskeratosis

2. What clinical sign was used in this study to determine the presence or absence of URTD?

A. Lethargy

B. Dry skin

C. Nasal discharge

D. Swollen eyes

3. True or False – URTD affects only the physical well-being of desert tortoises.

Answer: False, it also impacts their behavior and ability to perform necessary functions in the wild.

4. How do tortoises use olfaction to navigate their environment?

Answer: Tortoises are known to use olfactory cues to identify food, predators, and conspecifics.

5. How is Upper Respiratory Tract Disease different from a common cold or other respiratory illness?

Answer: URTD is caused by a highly contagious bacterium that is very difficult to treat. This means that tortoises cannot quickly recover from URTD and it can be fatal.

Post-Lesson Article: Nussear et al. (2012). Translocation as a conservation tool for Agassiz's desert tortoises: survivorship, reproduction, and movements.²

KEY POINTS:

- Desert tortoises tend to move great distances in the first season after translocation. They do not adopt home ranges in their first season, but should by the second season. This settling process may take longer or may not be reached for tortoises translocated to atypical tortoise habitat (e.g., areas with vegetation not typically associated with desert tortoise). This may be important when selecting a translocation site, or when selecting where to release animals within a large site. Managers should consider increased movement distances of translocated tortoises when evaluating sites for potentially risky features within expected movement paths such roads with heavy traffic unless the boundaries of the unsuitable features are fenced.
- Tortoises should be released in Spring or Fall, to avoid inhospitable hot summer months.
- Translocated tortoises produced the same number of eggs as resident animals. Thus, translocated animals may contribute to recruitment of hatchlings to the population.
- Adult female tortoises may be especially valuable members of the population and would be a preferred demographic group when considering candidates for translocation
- Using translocation for conservation is simultaneously a biological, economic, and political decision.
- Potential impacts to resident populations must also be considered when translocating animals to occupied habitats, as there may be deleterious effects to social structure, and limited resource availability (Berry 1986, Strum 2005, Linklater and Swaisgood 2008)

Vocabulary:

- Survivorship - the proportion of a population surviving to a given age³
- Extirpation - a species no longer surviving in regions that were once part of their range⁴
- Anecdotal - not necessarily true or reliable, because based on personal accounts rather than facts or research³
- Bajada - A broad slope of alluvial material (a deposit of clay, silt, and sand) at the foot of a long, steep slope³
- Site fidelity/philopatry - (of an animal or species) tending to return to or remain near a particular site or area.³

Check for Understanding Questions: (Answers are bolded for teacher reference)

1. The survivorship of the translocated tortoises was:

- A. The same as resident tortoises**
- B. Greater than resident tortoises
- C. Less than resident tortoises
- D. I don't know

2. Translocated tortoises tended to find a home range:

- A. By the end of the first year
- B. By the end of the second year**
- C. None of the above
- D. I don't know

3. The number of eggs produced by translocated tortoises was:

- A. Much lower than the resident tortoises
- B. Much higher than resident tortoises
- C. Similar to resident tortoises**
- D. I don't know

4. Why do you think translocated tortoises move great distances during their first year after being released in a new location?

Answer: After being released translocated tortoises spend the first year looking for a suitable home range. They are looking for specific habitat features like food sources, burrowing areas, water availability, and mates. They tend to settle down on a home range during the second year after being translocated.

5. Why is it important to consider the resident groups of animals before releasing translocated individuals into the same areas?

Answer: Releasing new individuals into the home range or territory of others can impact resident individuals' social structure and access to resources. It is also important because translocated animals might carry illness that could be transferred to wild populations and vice versa.

References

1. Germano, J., VanZerr, V. E., Esque, T. C., Nussear, K. E. & Lamberski, N. (2014). Impacts of upper respiratory tract disease on olfactory behavior of the Mojave desert tortoise. *Journal of Wildlife Diseases*, 50(2), 354–358.
2. Nussear, K. E., Tracy, C. R., Medica, P. A., Wilson, D. S., Marlow, R. W., & Corn, P. S. (2012). Translocation as a conservation tool for Agassiz's desert tortoises: survivorship, reproduction, and movements. *The Journal of Wildlife Management*, 76(7), 1341–1353.
3. <https://en.oxforddictionaries.com/>
4. <https://www.fws.gov/midwest/endangered/glossary/index.html>