Journal Club Teacher Guide:
"The presence of *Wolbachia* in Brood X cicadas"

Overview

This *Wolbachia* Project Journal Club contains three sections:

1. **Journal Club** – Students will read and critically discuss a *Wolbachia*-related research article. Guided questions are provided to lead readers through each section of the article with an emphasis on data analysis (figures) and experimental conclusions.
2. **Graphical Abstract** – Students will create a graphical abstract to illustrate the research article
3. **Claim-Evidence-Reasoning** – Students will formulate a claim, provide evidence, and communicate reasoning based on data/results resembling those presented in the research article

Connection with the Standards

The *Wolbachia* Project Journal Club connects disciplinary core ideas from Next Generation Science Standards (NGSS) and AP Framework with Common Core State Standards for ELA & Literacy.

Disciplinary Core Ideas include:

- NGSS - Biological Evolution: Unity and Diversity (HS-LS4)
    - Communicate scientific information that common ancestry and biological evolution are supported by multiple lines of empirical evidence (HS-LS4-1)
- AP – Gene Expression and Regulation (Unit 6)
    - Biotechnology (6.8) – Explain the use of genetic engineering techniques in analyzing or manipulating DNA (IST-1.P)
- AP – Natural Selection (Unit 7)
    - Phylogeny (7.9) – Describe the types of evidence that can be used to infer an evolutionary relationship (EVO-3.B); Explain how a phylogenetic tree and/or cladogram can be used to infer evolutionary relatedness (EVO-3.C)

Reading Standards for Literacy in Science and Technical Subjects include:

- Evaluate the hypothesis, data, analysis, and conclusions in a science or technical text (RST-11.12.8)
- Cite specific textual evidence to support analysis of science and technical texts (RST.9-12.1)
- Determine the central ideas or conclusions of a text (RST.9-12.2)
- Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks (RST.9-12.3)

* The standards listed above have been abbreviated; see the Common Core State Standards for detailed, grade-level standards.

Prerequisite Skills

No prerequisite skills are required for this activity. An introduction to Biotechnology - DNA isolation, amplification (PCR), visualization (gel electrophoresis), sequencing (Sanger), and evolutionary relatedness (phylogenetics) - is highly recommended.

Group Size

This activity can be performed in small groups (2-4 students) or as an individual project.

Teaching Time

The entire activity will take approximately 2-3 class periods. Each activity is a stand-alone unit and may be completed independent of the other modules.

- Day 1 (full class period): Read the article; work in groups to answer the Guided Questions
- Day 2 (full class period): Create a graphical abstract
- Days 3 (partial class period): Complete the CER activity

Supplies

1. **Journal Article**: Download the research article from the Journal of Emerging Investigators, https://emerginginvestigators.org/articles/the-presence-of-em-wolbachia-em-in-brood-x-cicadas
2. ***Wolbachia* Project Journal Club, Graphical Abstract, and CER:** The activity is available in a PDF or Word document; it may be printed or viewed online. The graphical abstract will require a computer and/or paper and colored pencils.