**READING COMPREHENSION: MAIZE**

* + Introduction

This assignment is all about maize. Maize originated in the Americas and was widely grown by the peoples of both North and South America.

The English word *corn* is actually from Old English and means *grain*. The Latin name *Zea mays* L. was assigned by Linnaeus (hence the authority “L.”) in 1737. *Zea*is ancient Greek, meaning *grain* or *cerea*l, and *mays* is from *mahiz*, which is the word for *maize* in the Taino language of the indigenous peoples of the Bahamas and Greater Antilles.

Maize continues to be an important crop in Central and South America and has now become a staple in many parts of Africa. In fact, maize was so important that it achieved religious significance within the short time since its domestication in the Americas.

In most cases, the ancestry of crop plants has been straightforward, with wild species remaining in the vicinity and resembling the crop plant. Corn, on the other hand, is so different from any wild species that its origins have been very elusive. The oldest archaeological evidence is from 6,250 years ago, which supports molecular clock estimates. The molecular clock is a technique that molecular biologists use to determine approximately how long ago two species diverged. Scientists can deduce the amount of time that has elapsed based on how many minor differences exist between each of the species’ DNA sequences. Genes are thought to change at a consistent rate, and so can provide a timeline for evolution.

Archaeological data supports the notion that corn was not domesticated over a long period of time. No intermediates exist between a progenitor and the corns that were grown as crops in the Americas. Another great mystery is the progenitor. Unlike other crop plants, no similar wild plant has been found to provide insight into the origins of corn. As you will learn during your investigation for this assignment, maize makes a very unlikely wild plant. It is unable to survive without the intervention of humans. As a result, a large, unanswered question has been: Where did maize come from?

In the 20th century, the origin of corn was the subject of heated debate. Two main schools of thought arose: the Tripartite hypothesis and the Teosinte theory.

According to the Tripartite hypothesis, corn is the result of a hybridization between wild maize and a species of *Tripsacum* (intergeneric hybridization). This theory was proposed by Mangelsdorf (Harvard). The Teosinte theory (Beadle) proposes that teosinte was the progenitor of maize, which seems unlikely because of its many differences from maize. The modifications that gave rise to corn would have been rapid. Today, most researchers support the Teosinte hypothesis (see Doebley, 1990). Eubanks (2001) is one of only a few scientists who currently support the role of Tripsacum in maize domestication. Doebely (1990) has suggested that it may take changes to as few as five genes for morphological changes to have occurred. This research is ongoing.

Galinat (2001) has offered a scenario that, whether accurate or not, illustrates the role that humans must have played in the development of corn as a crop. A beneficial mutation must have been recognized and, through selection and breeding, brought into cultivation. Indeed, corn, which recent research indicates resulted from a single domestication event, yielded much variation, as is reflected in the over 200 landraces that have been identified.

Resources

* + 1. Read the following articles. They are not available in the Library, so you can link directly to the PDF versions.
       - Eubanks, M. W. (2001). [The mysterious origin of maize](https://files.transtutors.com/cdn/uploadassignments/1350846_4_eubanks-biol3431-mysterious-origin-of-maize--2-.pdf). *Economic Botany,* *55*(4), 492–514.

The article by Eubanks was selected for this assignment because, in addition to providing historical background to the investigations of the origins of this most elusive crop plant, it also provides ethnobotanical information.

* + - * Galinat, W. C. (2001[). A reconstruction of a possible role of crucial observation leading to a rapid domestic transformation of wild teosinte into the first maize.](https://www.jstor.org/stable/4256491?seq=2#metadata_info_tab_contents)*Economic Botany,* *55*(4), 570–574.
    1. The following article is available as a supplemental resource:
       - Doebley, J. (1990). [Molecular evidence and the evolution of](https://www.jstor.org/stable/4255268?seq=1#metadata_info_tab_contents) maize. *Economic Botany 44*(3), 6–27. Retrieved from http://www.jstor.org/stable/4255268.

Instructions

If you have any questions about the assignment, consult your instructor

Short Answer

Answer the following six questions using full sentences and short paragraphs. The number following each question indicates the mark weighting for that question.

* + 1. Compare and contrast the structure of teosinte with that of corn. Why did people believe that teosinte could not be the ancestor to corn? Why were its kernels probably not used to a great extent as food? (4 marks)
    2. The movement of corn as a crop throughout the Americas was very slow. What accounts for this? (3 marks)
    3. What archaeological data was used to provide information on the domestication of corn? What did each type of information reveal? (3 marks)
    4. How did the domestication of corn differ from that of wheat? Could Galinat’s scenario for corn be applied to the domestication of wheat? Explain your answer. (4 marks)
    5. Explain why corn seed is most commonly purchased every year rather than saved from a previous year’s crop. (3 marks)
    6. What are the main differences between the Tripartite and the Teosinte theories? What type of information would provide evidence that would put to rest the controversy? (3 marks)