Cone Snail Fossils

The Sample

The 28 fossil cone snail shells used in this exercise come from the Plio-Pleistocene fossil record of the southeastern United States. Most of the specimens lived between 2-3 million years ago.

Classification Information-- The "Answer"

The correct species assignments of the 28 cone snail shells used in this exercise were evaluated by paleontologist Dr. Jonathan Hendricks, who specializes on the fossil record and evolution of this group of snails. Dr. Hendricks recognizes seven (7) different species in this sample. Three belong to the genus *Conasprella* (*Conasprella delessertii*, *Conasprella marylandica*, and *Conasprella onisca*) and four belong to the genus *Conus* (*Conus adversarius*, *Conus anabathrum*, *Conus spurius*, and *Conus yaquensis*). Key features for identifying fossil cone snail species include: the overall shape of the shell, the presence or absence of grooves on the shell, the presence or absence of small bumps near the tip of the shell, and the coloration pattern of the shell, which can sometimes be revealed using ultraviolet light.

Links to detailed information about each of the species (including more photographs, including of revealed shell coloration patterns), as well as interactive 3D models, are presented below, along with a key to the "correct" identifications for each one of the cards.

Conasprella delessertii (Cards 1, 11, and 23). This species is still alive today.
- Neogene Atlas page: http://neogeneatlas.net/species/conasprella-delessertii/
- 3D model: https://sketchfab.com/models/34e2423cb2cf4df498ff6d272e95641f

Conasprella marylandica (Cards 13, 21, and 24). This species is extinct and has never been found in Maryland!
- Neogene Atlas page: http://neogeneatlas.net/species/conasprella-marylandica/
- 3D model: https://sketchfab.com/models/6d175ee89890444a8049c5aa1ebaeb3f

Conasprella onisca (Cards 5, 12, and 26). This species is extinct.
- Neogene Atlas page: http://neogeneatlas.net/species/conasprella-onisca/
- 3D model: https://sketchfab.com/models/4faa328220844f9c9c17bd0a1a0eec1a

Conus adversarius (Cards 2, 6, 8, 17, and 22). This species is extinct. It is the only left-handed cone snail (living or extinct): its shell opens on the left, rather than on the right.
- Neogene Atlas page: http://neogeneatlas.net/species/conus-adversarius/
- 3D model: https://sketchfab.com/models/9450fa05b9bb44fa97bd15d12d45e49d

Conus anabathrum (Cards 4, 16, 18, 20, 27). This species is still alive today.
- Neogene Atlas page: http://neogeneatlas.net/species/conus-anabathrum/
- 3D model: https://sketchfab.com/models/bfa1701457c84eaabdd807566eef4955

Conus spurius (Cards 9, 10, 14, 19, 25, and 28). This species is still alive today.
- Neogene Atlas page: http://neogeneatlas.net/species/conus-spurius/
- 3D model: https://sketchfab.com/models/3890a467436542068e9e03726c52452b

Conus yaquensis (Cards 3, 7, 15). This species is extinct.
- Neogene Atlas page: http://neogeneatlas.net/species/conus-yaquensis/
- 3D model: https://sketchfab.com/models/bc6c5ca69dd74b488ae3ae759aaaefcc

Name _____

Philosophy of Taxonomy

Most biologists and paleontologists define a species as a group of biologically similar organisms that are able to successfully mate and reproduce. While species may truly exist in nature, they are frequently difficult to recognize. This is because no two individuals within a species are exactly identical; all show subtle variations. Think about dogs: all belong to the same species, but some are large, some are small; some have long legs, some have very short legs. Separating variations that occur within a species from those variations that exist between closely related species can be very challenging. Some scientists define species broadly: they think that species show a lot of variation. Other scientists define species much more narrowly, with species showing only small amounts of variation.

Taxonomists--scientists who study, identify, and classify particular groups of plants and animals--attempt to determine the features that separate species. Those separations are hypotheses that may be tested as new information becomes available. For example, one scientist might divide 15 clam specimens into three different species based on differences in shell shape, but a second scientist might add genetic data and instead recognize five separate species. Neither determination is "correct", though the hypothesis of the second scientist is based on more evidence and is therefore preferred.

The job of recognizing species is even more of a challenge for paleontologists (this issue even has a name: "The Species Problem in Paleontology"). This is because paleontologists generally only have access to the mineralized hard parts of organisms (e.g., bones or shells) and typically have no access to soft parts or genetic information that is so valuable for recognizing living species.

Follow up questions

1. What is taxonomy?

2. How do scientists decide which individuals belong to which species?

3. Do scientists always agree on classification? Why or why not?

4. Why might a scientist change their classification system?

5. Is there a “right” answer? Why or why not?