**UNIVERSIDADE DE BRASÍLIA**

**PROGRAMA DE PÓS-GRADUAÇÃO EM ZOOLOGIA**

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**SELEÇÃO PARA VAGAS DO PROGRAMA DE PÓS-GRADUAÇÃO EM ZOOLOGIA PARA O CURSO DE MESTRADO ACADÊMICO PARA O SEGUNDO PERÍODO LETIVO DE 2022**

**PROVA DE INTERPRETAÇÃO DE TEXTO EM LÍNGUA ESTRANGEIRA**

**Número de inscrição:**

Avalie o texto e responda às perguntas 1 e 2.

“Body size and shape play a universal and fundamental role in the mechanical and physiological function of all organisms. At the most basic level, the motion of terrestrial vertebrates is constrained by Newtonian mechanics; that is, acceleration is a function of force and mass. Body proportions describe the magnitude and distribution of mass within the moving body and the lengths of levers responsible for generating that movement. Body shape also plays a determinant role at multiple physiological levels; for example, in describing the space available for accommodating major organ systems, and body surface area for heat exchange. Because different environments and behaviours place different demands on the functional mechanics and physiologies of organisms, it is expected that body proportions should vary across animals occupying different ecological niches. However, modification of body size and shape by ecological pressures may also be constrained by other factors, notably phylogenetic history and the ecological trajectory of evolutionary change”.

Extraído de: Maher, A.E., Burin, G., Cox, P.G. et al. Body size, shape and ecology in tetrapods. Nature Communications, 13, 4340 (2022).

1. De acordo com o texto, quais as influências fisiológicas que o tamanho corporal pode exercer em um organismo?

2. Além de fatores ecológicos, quais outros fatores podem determinar o tamanho corporal de um animal?

Avalie o texto e responda às perguntas 3 e 4.

“Although the first ten million years of whale evolution are documented by a remarkable series of fossil skeletons, the link to the ancestor of cetaceans has been missing. It was known that whales are related to even-toed ungulates (artiodactyls), but until now no artiodactyls were morphologically close to early whales. We studied new dental, cranial, and postcranial material for *Indohyus*, a middle Eocene raoellid artiodactyl from Kashmir, India. All fossils of *Indohyus* were collected at a middle Eocene bone bed extending for about 50 m at the locality Sindkhatudi in the Kalakot region of Kashmir. The middle Eocene artiodactyl family Raoellidae is broadly coeval with the earliest cetaceans, and both are endemic to south Asia. Raoellids, as a composite consisting of several genera, have been added to some phylogenetic analyses, but no close relation to whales was found because raoellid fossils were essentially limited to dental material. Here we show that the Eocene south Asian raoellid artiodactyls are the sister group to whales. The raoellid *Indohyus* is similar to whales in the structure of its ears and premolars, in the density of its limb bones, and in the stable-oxygen-isotope composition of its teeth. Our analysis identifies raoellids as the sister group to cetaceans and bridges the morphological divide that separated early cetaceans from artiodactyls. This has profound implications for the character transformations near the origin of cetaceans and the cladistic definition of Cetacea, and identifies the habitat in which whales originated”.

Extraído de: Thewissen, J., Cooper, L., Clementz, M. et al. Whales originated from aquatic artiodactyls in the Eocene epoch of India. Nature, 450, 1190–1194 (2007).

3. Segundo o texto, por que, inicialmente, as análises filogenéticas incluindo diferentes gêneros de Raoellidae não mostrava uma relação próxima desse grupo com os cetáceos viventes?

4. De acordo com o estudo realizado, quais características mostraram que o Raoellidae *Indohyus* possui uma relação filogenética mais próxima dos cetáceos?

Avalie o texto e responda às perguntas 5 e 6.

“Explorers such as Charles Darwin won fame for bringing exotic plants and animals back to England for classification and cataloging. But now, the field of taxonomy itself is in danger of dying in Britain, says a report released 16 May by the British House of Lords. The imminent demise threatens international conservation efforts, the committee warns.

Since 1992, funding for systematic biology at major research institutions in the United Kingdom has dropped between 15% and 25% - a drop of about $21 million a year, the report found. Furthermore, funding bodies have increasingly favored subdisciplines in systematics that use new molecular and genetic research to uncover evolutionary relationships over the subdiscipline of taxonomy - which focuses on identifying and naming organisms. The committee also found that taxonomists aren't getting any younger. "The leading experts in many species are [in Britain], but they're getting old," says report chair Joan Walmsley of the House of Lords.

The decline of taxonomy and systematic biology is potentially disastrous for conservation work, the report warns. If the trend continues, says Paul Henderson, director of science at the Natural History Museum in London, "there isn't going to be the expertise in the future that can identify the world's diversity." Without good taxonomic information, conservationists can't properly monitor species or implement conservation plans.

The committee calls for funding levels to be returned to 1992 amounts (adjusted for inflation), priorities to be set for future systematic biology work, and a pilot study to put taxonomic information online, among other recommendations. Walmsley expects that recommendations will get a fair hearing in Parliament. But saving the field will take more than money, she says. Taxonomy, which evokes images of white-haired scientists examining dusty museum specimens, needs a makeover. Young people need to get the message that "it's very exciting work," says Walmsley.”.

Extraído de: Mertl, M. 2002. Taxonomy in Danger of Extinction. Science. doi: 10.1126/article.36121.

5. Segundo o texto, quais os problemas que o declínio da taxonomia pode trazer para os estudos em outras áreas, como biodiversidade e conservação?

6. De acordo com o texto, além de maior financiamento, quais outras ações podem ser implementadas para fomentar estudos na área da taxonomia?

Avalie o texto e responda às perguntas 7 e 8.

“Bees and wasps are important facets of natural capital to be valued by human societies: bees pollinate wild flowers and agricultural crops; wasps regulate arthropod populations, including insect vectors of human diseases and crop pests. Despite the importance of both taxa, bees are universally loved whilst wasps are universally despised. This study explores some of the reasons behind this. Here data are presented from almost 750 members of the public on their perceptions of insects, including bees and wasps. In addition, an analysis is conducted of researcher effort on bees and wasps, using publication numbers of peer-reviewed papers over the last 37 years, and unpublished conference proceedings at specialist international conferences over the last 16 years. The results show that wasps are indeed universally disliked by the public and moreover are unpopular research taxa among researchers. Words used to describe wasps are emotive and negative, whilst those describing bees are functional and positive. A low level of interest in nature and a lack of knowledge (among the public) and research effort (among scientists) regarding the ecosystem services of wasps are likely to be at the root of the negative perception. Whilst the ecosystem services of bees are well understood by the public, those provided by wasps are poorly understood. Positive action to promote research on wasps and to overhaul the public image of wasps via outreach and the media could help to reset the imbalance in appreciation of two of the world's most ecologically important taxa. Cultural shifts to a more positive attitude towards wasps could be pivotal in working with these facets of natural capital, rather than against them”.

Extraído de: Summer et al. 2018. Why we love bees and hate wasps. Ecological Entomology 43: 836-845.

7. Quais os métodos utilizados pelos autores neste estudo?

8. O que os autores do estudo indicaram como os principais motivos que levam a percepção negativa sobre as vespas?

Avalie o texto e responda às perguntas 9 e 10.

Accurate time-calibrated phylogenies are the centerpiece of many macroevolutionary studies, and the relationship between the size and scale of molecular data sets and the density and accuracy of fossil calibrations is a key element of time tree studies. Here, we develop a target capture array specifically for living turtles, compare its efficiency to an ultraconserved element (UCE) dataset, and present a time-calibrated molecular phylogeny based on 539 nuclear loci sequenced from 26 species representing the breadth of living turtle diversity plus outgroups. Our gene array, based on three fully sequenced turtle genomes, is 2.4 times more variable across turtles than a recently published UCE data set for an identical subset of 13 species, confirming that taxon-specific arrays return more informative data per sequencing effort than UCEs. We used our genomic data to estimate the ages of living turtle clades including a mid-late Triassic origin for crown turtles and a mid-Carboniferous split of turtles from their sister group, Archosauria. By specifically excluding several of the earliest potential crown turtle fossils and limiting the age of fossil calibration points to the unambiguous crown lineage *Caribemys* *oxfordiensis* from the Late Jurassic (Oxfordian, 163.5–157.3 Ma) we corroborate a relatively ancient age for living turtles. We also provide novel age estimates for five of the ten testudine families containing more than a single species, as well as several intrafamilial clades. Most of the diversity of crown turtles appears to date to the Paleogene, well after the Cretaceous-Paleogene mass extinction 66 mya.

Extraído de: Shaffer, H.B. et al. (2017) Phylogenomic analyses of 539 highly informative loci dates a fully resolved time tree for the major clades of living turtles (Testudines). Molecular Phylogenetics and Evolution, 115, 7–15.

9. Qual foi a vantagem apresentada pelo autor do conjunto de dados utilizados no presente estudo em relação ao conjunto de dados moleculares utilizados em um estudo anterior direcionado ao mesmo grupo taxonômico?

10. Qual a relação encontrada entre a extinção em massa do Cretáceo-Paleógeno (K-Pg) e os resultados encontrados por Shaffer et al. (2017)?