

Brazilian fossils are not necessarily cultural heritage



In their Comment published in *Nature Ecology & Evolution* concerning the part that scientific societies can play in the repatriation of fossils, Araújo-Júnior et al.¹ did not consider the complete set of laws that govern fossils in Brazil. This gives the impression that Brazilian law predominantly considers fossils as cultural heritage. In fact, Brazilian legislation is conflicted on issues related to the identification, protection and management of palaeontological heritage. In different Brazilian laws (Table 1), fossils are variously considered as (1) a mineral resource, used for the production of cement, fertilizers, ornamental rocks and so on; (2) an educational resource in accordance with Law No. 13.575/2017, article 2, item XIII, when intended for museums and research institutions; and (3) cultural heritage, where recognized by the responsible body, the National Historical and Artistic Heritage Institute (IPHAN)^{2,3}.

Just as not all urban complexes or sites of ecological value are cultural heritage, not every fossil or palaeontological site can be considered cultural heritage. To date, IPHAN has recognized only the 'Fossil Forest' on the Potim River (1510/2003) as cultural heritage⁴. The fact that the recognition of palaeontological sites as cultural heritage by IPHAN is rare reinforces the conclusion that, on the whole, Brazil currently considers fossils to be mineral heritage^{2,3,5}. As such, the National Mining Agency (ANM) is the body that is responsible for authorizing and managing research that involves fossils.

Legally unfounded interpretations related to fossils in Brazil have led to complaints from Brazilian and foreign researchers, and actions to criminalize social and economic activities and even scientific research. ANM-authorized scientific research that carries out activities for the screening, identification, rescue and conservation of fossils recovered through mining has been paralysed by the interpretation of fossils as cultural heritage, because this interpretation has encouraged legal proceedings even though it remains disputed. Both researchers and companies have spent time and money responding to lawsuits that are motivated by an incorrect interpretation

Table 1 | Complete Brazilian legislation related to fossils

Legal document	Subject covered
Decree 25/1937	National historical and artistic heritage
Decree 4146/1942	Protection of fossiliferous deposits
Decree 227/1967	Brazilian Mining Code, articles 1, 3 (I), 4 and 10 (II e III)
Decree 72.312/1973	Property of the Cultural Assets, articles 1, 3 and 13
Decree 80.978/1977	1972 UNESCO – World Heritage, Cultural and Natural Protection
Federal Constitution 1988	Articles 20 (I, IX e X), 23 (III e IV), 24 (VI e VII) and 216 (V)
Decree 98.830/1990	Collection of scientific data and materials by foreigners
Law 8.176/1991	Crimes to economic order
Law 8970/1994	Changes mineral resources research company into a public company
Law 9.605/1998	Environmentally harmful activity
Decree 3.166/1999	Unidroit – stolen or illicitly exported cultural assets
Law 9.985/2000	National system of conservation units
Ordinance 23/2011	Siscomex – foreign trade operation
Ordinance 155/2016	Normative Legal regulation of the National Department of Mineral Production
Ordinance 155/2016	IPHAN – material cultural heritage policy
Law 13.575/2017	Foundation of the National Mining Agency
Decree 9.406/2018	Regulates the mining code

Further information is available from refs. 2,3.

of the legislation. This scenario has led many mining companies to prevent scientific activities, to avoid being exhausted with legal actions. This situation makes the management and preservation of Brazilian palaeontological heritage even more precarious.

Currently, Brazilian legislation allows rocks that contain fossils to be sold as ornamental rocks or ground for the production of cement or other types of mineral products without any legal obstacles. Rocks with fossils can also be exported to other countries. This dual status of fossils as a commercially mined resource (a consequence of them being considered natural heritage) and culturally protected heritage creates loopholes and poses difficult ethical and legal questions: for example, whether, if a fossil were identified among a large shipment of exported limestone, the importer would be committing a crime by subsequently allocating this material to a scientific collection abroad. The same

question applies to any Brazilian individual who buys a rock for industrial, agricultural or civil construction purposes and discovers it has fossils in it – of what they should do with the material they have legally bought.

In practice, it is through mineral extraction that many fossil specimens are discovered^{4,6–8}. Therefore, finding ways to reconcile mining and preservation is important to achieve the preservation of fossils; it is unknown how many rare specimens could be found if there was a policy of integrating mining activities and the rescue of fossils.

In this context, the Brazilian Federation of Geologists (FEBRAGEO) supports new regulations with technical–scientific criteria for the management of fossiliferous heritage that consider screening, evaluation, classification and destination procedures according to the relevance of deposits and specimens, and with professional monitoring by accredited institutions. This would ensure the allocation

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of relevant, rare specimens or those considered cultural heritage to museums, and allow the use of other fossils for educational and cultural purposes or commercialization as mineral, agricultural or industrial products or as individual specimens.

Efforts to repatriate Latin American palaeontological heritage are commendable and should be encouraged, but at the same time millions of Brazilian fossils are destroyed⁴ owing to the lack of clear regulation and complicated dual legal status. We argue that if palaeontological research were incorporated into mining activities as an activity of social and economic interest (and avoiding any blanket consideration of fossils as cultural heritage), countless specimens could be protected.

At the international level, the development of a United Nations convention (or one of its agencies) on geodiversity would be the best way to reconcile mineral extraction and heritage preservation. The exchange of fossils between countries disseminates knowledge and popularizes science. Restrictive and punitive actions regarding public and democratic access to natural resources do not represent

an adequate way to educate the population and preserve the Earth's geological history.

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Competing interests

The authors declare no competing interests.