**Section: Opinions**

**AMAZON UNDER ATTACK: A WARNING FOR GLOBAL WARMING**

*Rosa Maria Dias1\*, Raffael Marcos Tófoli2, Taise Miranda Lopes1 & Gustavo Henrique Zaia Alves1*

1 Laboratório de Ecologia e Ictiologia, Pós‑Graduação em Ecologia de Ambientes Aquáticos Continentais na Universidade Estadual de Maringá, Maringá, PR, Brazil, bloco H90, sala 002, Avenida Colombo, 5790. Phone: +55-44-3011-4607

2 Instituto Federal Catarinense (IFC). Rodovia SC 135, km 125 - Bairro Campo Experimental - CEP 89564-590 - Videira - SC - Fone: (49) 3533-4900

\*Corresponding author

E-mails: [rmdias2003@yahoo.com.br](mailto:rmdias2003@yahoo.com.br); [biotofoli@gmail.com](mailto:biotofoli@gmail.com); [taisemlopes@gmail.com](mailto:taisemlopes@gmail.com); [alvesghz@yahoo.com.br](mailto:alvesghz@yahoo.com.br)

Running title: *Amazon under attack*

**Abstract**

The Amazon rainforest has been the target of several attacks, such as the massive increase in deforestation and fire outbreaks. The Amazon biome is not only composed by forest ecosystems, but also by an important carbon stock system called Peatland, which contains ca. 1 to 8 billion tons of carbon in its plants and soil. If burned, this peculiar ecosystem is likely to the release tons of greenhouse gases, which may aggravate global warming. Therefore, our objective is to alert and anticipate problems associated with deforestation and fires in Peatland that, if not contained, may difficult global warming controlling and the achievement of goals set in the Paris Agreement (which Brazil is signatory). We highlight that national and international political measures, aimed at strengthening the environmental inspection agencies and the integration of Amazonian countries, are fundamental to prevent the burning of the Peatlands.

**Keywords:** Peatlands; Amazon on Fire; Brazilian government; global climate; greenhouse gas emissions.

The largest and most biodiverse tropical forest in the world continues to burn (Andrade 2019, Moutinho *et al*. 2020). Brazil is facing several cuts in priority sectors to maintain the country's sustainable development, such as science, technology, education, and environment, which is being dismantled. The deterioration of the Environmental Ministry speeded up with the current far-right Brazilian government, which is dismembering and weakening fundamental inspection federal agencies subjected to the ministry (i.e. Instituto Brasileiro do Meio Ambiente e dos Recursos Renováveis – IBAMA and Instituto Chico Mendes de Conservação da Biodiversidade – ICMBio). In 2019, several actions resulted in a cut in the Amazon fund by Germany and Norway (Boffey 2019), whose main objectives was to prevent deforestation, fires and to promote sustainable development in the region. In 2020, the COVID-19 pandemic has further exacerbated deforestation, due to an even greater reduction in inspections by these already weakened agencies. Deforestation in 2019 and in early 2020 left fuel for huge fires on the forest floor in the dry season, which begins in late June (Moutinho *et al*. 2020). To avoid the worst burning scenario, it is necessary to carry out proper fire management and strict inspection (Aragão *et al*. 2020).

For many scientists, there’s no doubt that Brazil’s fires are caused by deforestation (Barlow *et al*. 2019, Escobar 2019). It has been shown that the fire consumed the Amazon region and part of the Pantanal, reaching the border of Brazil, Paraguay, Bolivia and Peru, sweeping approximately 20,000 hectares of vegetation (Escobar 2019, Martinez 2019, Rebecca Lai *et al*. 2019, Madeiro 2019) and part of indigenous reserves. In 2020, deforestation in the Amazon increased 51% in the 1st quarter, a record for the period (Amaral 2020). This year, the burning season could be more severe. This is because a large volume of deforested areas in 2019 stopped being burned due to the rainy season in December, and this unburned organic matter, added to what was deforested in early 2020, may create a massive quantity of dry matter which can be the trigger for an even greater burning (Moutinho *et al*. 2020).

The effects of Amazon deforestation and the consequent fires are not only local, but it extends to regional and global scales with unprecedent environmental, political and socioeconomic consequences. The very first fire’s effect was seen in the most populous Brazilian city, São Paulo, when a dark cloud covered the city, which is at least 1500 km far from Amazon Biome (Alencar *et al*. 2020). Now, the southern region of Brazil is experiencing severe drought, the most intense in recent years (G1 2020a, 2020b). This scenario may have been aggravated by the large losses of forest in the past two years. Besides its high biodiversity, the Amazon rainforest also aids in controlling the planet's temperature and rainfall in various regions of South America, which supports several ecosystems in addition to economic activities such as hydroelectric energy generation (responsible for 80% of total energy consumed in Brazil) and agribusiness.

Another worrying fact is the degradation of forest-associated ecosystem, such as the peatland ecosystems of the Amazon, mainly concentrated in the Peruvian Amazon (Lähteenoja et al. 2012, Draper et al. 2014, Lilleskov et al. 2019) in Pastaza-Marañon River. Increased deforestation due to land use make these wet ecosystems susceptible to fire (Adrianto *et al*. 2020). The peatlands comprise ecosystems that concentrate large amounts of carbon reserves, storing 1-8 PgC (1 Pg = 1 billion tons), in an area of approximately 35.000 km2 (Lähteenoja *et al*. 2012). Tropical peatlands account for a substantial part of global soil carbon storage and are very important in terms of potential regional greenhouse gas fluxes, as land-use change can quickly return their carbon stocks to the atmosphere (Lilleskov et al. 2019, Gewin 2020). If burned, peatlands may become a new source of carbon to the atmosphere and highly contribute to the acceleration of global warming through the greenhouse effect. In fact, it already happened in Indonesia, in 1997, when after a period of drought and anthropic fires, peatlands emitted between 0.81 and 2.57 gigatonnes of carbon into the atmosphere, equivalent to 13 to 40 percent of the world's annual fossil fuels emissions (Draper et al. 2014). The concern about gas emissions in peatland and its effects on global warming is so high that, in April 2019, the United Nations adopted the first resolution to protect these ecosystems (Page *et al*. 2002).

Our goal here is to anticipate fires events, especially those that might affect peatlands, which would jeopardize any projection of measures taken to contain global warming, including international agreements that Brazil have already rectified to accomplish, e.g. the Paris Agreement (United Nations Climate Change 2016) and the CDB Aichi target 8 (Convention on Biological Diversity 2010). The current environmental political crisis may have serious consequences for the conservation of the entire Amazon Forest, considering that Brazil has historically led international treaty initiatives (i.e. Amazon Cooperation Treaty Organization) among States that share the Amazon territory: Brazil, Bolivia, Colombia, Ecuador, Guyana, Peru, Suriname and Venezuela (Ministério das Relações Exteriores 2019).

In this sense, it is necessary to strengthen this socio-environmental block, without excluding countries due to different political ideologies (i. e. “Leticia Pact”) (Bellamy 2019). Countries need to continue investing financially in environmental projects such as the Forest Coverage Monitoring in the Amazon Region Project, implemented since mid-2011 in partnership with the National Institute for Space Research (INPE) (Ministério das Relações Exteriores 2019), thus reducing deforestation levels in the forest. In addition, countries need to ratify the goals of the Paris Agreement, which aims to prevent the effects of climate change and reduce greenhouse gas emissions.

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