# TAMBAQUI (Colossoma macroponum)

Tambaqui is a fruit and nut eating, medium distance migratory species. The tambaqui is a Characin, very commonly found in floodplain lakes. Tambaqui is the most important fish in fishing and psiculture in the Amazon Region. In the 1990s and early 2000s, the tambaqui became the main focus of efforts to develop varieties for Amazon aquaculture (NETO & DIAS, 2015; AMAZON WATERS ALLIANCE).

Tambaqui Fish

Roasted Tambaqui

**Roundfish (Peixe Redondo):**
The tambaqui is one of three species of characin (Tambaqui, Pirapitanga, and Pacu) used in aquaculture along with two hybrids (Tambacu and Tambatinga) that are crosses of tambaqui with the other two species. This group of species and hybrids is referred to collectively as the commercial category of "roundfish" (peixe Redondo) (ALVES, 2020). In 2015, this group represented 10.4% of Brazilian production and in 2021, in the state of Rondônia alone, this group represented 47% of the national production of this species (RURAL SUSTENTÁVEL, 2023; ALVES, 2020).

**Subproducts:**
Tambaqui is a food fish generally sold weighing approximately 3 kg, whole fish or divided into two halves (NETO et al., 2017). The ribs of the tambaqui are much appreciated as is the loin and these parts are increasingly marketed separately (COCAR & CO, 2024; TORRENTE, 2015).

**Current market size**:
In 2020, Brazil produced around 100.544 tons of Tambaqui, production value of approximately BRL 783.8 million (≅ USD 144.09 million). The three states that produced the most were Rondônia with 39.661 tons (52.7%), Maranhão with 11.575 tons (11.5%) and Roraima with 11.207 tons (11.1%) (IBGE, 2021).
In 2021, national tambaqui production reached a peak of 112.853 tons, with a production value of BRL 1 billion (≅ USD 169.6 million). The 3 largest producers were the states of Rondônia with 53.018 tons (46.9%), Maranhão with 11.456 tons (10.1%) and Roraima with 11.416 tons (10.1%) (IBGE, 2022).
In 2022, national tambaqui production reached a peak of 109,798 tons, with a production value of BRL 1.096 billion (≅ USD 206.9 million). The 3 largest producers were the states of Rondônia with 50,671 tons (46.1%), Roraima with 11,628 tons (10.5%) and Maranhão with 10,945 tons (9.9%) (IBGE, 2023).
Regarding tambaqui exportation, In 2020, Brazil exported around 300 tons of tambaqui (VALENTI et al., 2021). Tambaqui was the second most exported species in Brazilian production in 2022, with

US$268 thousand, approximately 70 tons (EMBRAPA, 2023; PEIXE BR, 2023). The national tambaqui exports in 2023 had a sales volume of USD 798 thousand (≅ BRL 4.1 million) (SEBRAE, 2024).
In the state of Rondônia alone in 2019, tambaqui exports represented 0.67% of total fish sales to other countries. In 2020, tambaqui exports represented 4.81% – growth was 648%, representing a total of BRL 562.8 thousand (≅ USD 103.4 thousand) (FACER, 2021). Seeking to strengthen exports, in 2023, the product "Tambaqui ribs" was, for the first time, among the attractions at the Seafood Expo North America held in Boston, Massachusetts, United States of America, and was awarded as the best food service product, leaving for brings more than 70 other products from different parts of the world. This participation and awards further expand the range of exports, which has been growing every year (MOURA, 2024).

**Projected future market size**:
The global fishing aquaculture nets market size is estimated to grow at a CAGR of 4.65% between 2023 and 2028. The market size is predicted to increase by USD 406.11 million, including the Tambaqui market (TECHNAVIO, 2023). Assuming these constraints can be overcome and tambaqui production grows at the same rate as Brazilian aquaculture 5%/yr, the national market for tambaqui could reach 150,000 tons by 2030 and 310,000 tons for the “roundfish” group as a whole.

**Volumes sold/consumed**:
In 2020, Brazil produced around 100.544 tons of Tambaqui. In 2021, national tambaqui production reached a peak of 112.853 tons. In 2022, national tambaqui production reached a peak of 109,798 tons (IBGE, 2021; IBGE, 2022; IBGE, 2023).
World fish consumption increased by 128% from 1961 to 2018, reaching approximately 20.5 kg/per capita/year. In Brazil, this food culture is prominent in the Amazon region, reaching consumption of 18.6 to 29.4 kg/per capita/year, where the most consumed fish is Tambaqui (LUIZ et al., 2022).

**Price Trends**:
The price of tambaqui may vary depending on the location where it is sold. For example, in the State of Rondônia, the average price per kilo of tambaqui was BRL 9.60 (≅ USD 1.81). In the state of Amazonas, the average price of whole tambaqui is BRL 15.99/kg (≅ USD 3.02/kg) and tambaqui fish fillets are BRL 22.99/kg (≅ USD 4.35/kg). However, a whole 12 kg tambaqui has already been sold for BRL 250 (≅ USD 47.16), approximately BRL 20.83/kg (≅ USD 3,93) (SEPROR, 2024; G1RO, 2022).
However, 800g of Ribs with Tambaqui Loin can be found for BRL 54.00 (≅ USD 10.22), approximately BRL 67.5/kg (≅ USD 12.78) (COCAR & CO, 2024).

**History**:
The Amazon fisheries sector is undergoing a major transition. Originally based on the capture of wild fish, it is increasingly based on fish produced through aquaculture (EMBRAPA, 2015). This change was precipitated in part by law No. 11,428 of 2006, which prohibited the cultivation of exotic species in the Amazon states (BRASIL, 2006). Aquaculture researchers have switched to Amazonian fish species, especially tambaqui and related species, among other popular Amazonian fish species. The development strategy adopted by aquaculture producers sought to compete with traditional capture fisheries for Amazon consumers based on the argument that wild fisheries are being depleted and aquaculture is growing to fill the gap between fish supply and demand. This scenario is playing out as planned (COSTA et al., 2022; MCGRATH, 2019). Around 2015, Rondônia became the largest

aquaculture producer in Brazil, however, with the rise in the rapid growth of sales of the GIFT variety of tilapia, Rondônia has been displaced by Paraná and other tilapia producing states (FILHO, 2016).
While the first part of the strategy, taking over the Amazon market for wild fish, has succeeded thus far, the second part, expansion into the national and international markets has been far more difficult. Brazilian consumers outside the Amazon tend to have low per capita rates of fish consumption and are unacquainted with amazon fish species (OLIVEIRA, 2024). Despite this, tambaqui is the second most produced fish in Brazil and the most produced in the Amazon region, being led by the State of Rondônia, the third largest fish producer in Brazil in 2023 (PÉTRIN, 2024).

**Production Systems & Environment: Agroforestry, Wild Harvest, Plantation**
Aquaculture offers opportunities for integration with a variety of agricultural production systems. An example is the aquaponics system, recycling and recirculating water and nutrients (FERRI et al., 2018). As an example, we have aquaponics integrating aquaculture and vegetable cultivation, where up to 90% of water can be saved compared to conventional agriculture and also completely eliminate the release of effluents into the environment (EMBRAPA, 2015).
Another water recycling system from aquaculture is fertigation, where water from fish tanks is distributed throughout the plantation. A good example is the association of aquaculture with açaí cultivation, in which the water in fish tanks is changed daily and distributed across the açaí plantation. These approaches can be adapted to other agroforestry systems taking advantage of the interface between aquatic and terrestrial systems (COLPANI, 2016).

**Time to maturity**:
Farmed tambaqui generally reaches 1.5 to 2 kg in 1 year of breeding (SENAR, 2017).

**Producer Profile & social impacts:**
Aquaculture is practiced at a wide range of scales and producer profiles from smallholders to large commercial enterprises. 97% of Brazilian aquaculture producers have between 0 and 5ha of ponds. The state average for Amazon states ranges between 94% and 99%. In fact, the average area of aquaculture ponds in two of the main producing states, Paraná and Rondônia, is only about 2-3 hectares (PEIXE BR, 2023; PEIXE BR, 2018).

**Production Issues:**
Some issues may be present in the production of tambaqui, such as some worms, parasitic diseases and climate changes (frost, drought, high temperatures, etc.) (CRESCÊNCIO & IZEL, 2021; ENGEPESCA, 2019 FUGIMOTO et al., 2015). More research is needed to improve tambaqui production performance (ARAÚJO, 2023; FEED & FOOD, 2023; SÁNCHEZ, 2023).

**Processing**: One of the major issues with the tambaqui is a “y” shaped bone in the loin (lombo). Thus far breeders have not been able to produce a boneless variety that breeds true across generations. However, processing techniques have been developed to remove the bone. More generally, for tambaqui to gain demand in markets outside the Amazon, special cuts are necessary. However, to obtain these types of cuts, larger fish are needed, weighing more than 2.5 kg (EMBRAPA, 2017).

**Supply Chain Issues:** A major challenge in the Amazon is the development of cold chains that can reliably maintain temperatures that conserve quality and ensure that fish arrive at their destination in optimal condition. In many areas the cold chain infrastructure is rudimentary and unreliable. A second

major challenge is to create local storage facilities to optimize local fish processing capacity by combining lots of the same sized fish to optimize processing efficiency (GONÇALVES, 2023; EMBRAPA, 2014).

**Markets:**
Numerous specialists have noted that tambaqui and other amazon fish species have great export potential (EMBRAPA, 2023). Given low rates of fish consumption in Brazilian markets, export to markets in the US and Europe with high rates of per capita fish consumption may be more accessible to high quality Amazon fish products. Consumer interest in US and European markets could be enhanced by marketing strategies that emphasize the production of Amazon fish and the positive contributions of Amazon aquaculture to shifting Amazon protein production from beef to fish, reducing pressure on Amazon forests and creating opportunities for large scale reforestation, agroforestry and silviculture (PANTANEIRO NORTE, 2024; GENTE DE OPINIÃO, 2022). Over time development of US and European markets for Amazon fish could help drive the shift from beef to fish, gradually slowing and eventually reversing carbon emissions as deforestation declines and reforestation expands (MCGRATH et al., 2020; MCGRATH, 2019).

**Carbon credit/sequestration potential**:
There is considerable potential for carbon credits and sequestration arrangements taking advantage of the high productivity of aquaculture relative to beef production and the significant percent of aquaculture producers who also produce beef or other crops (FENG et al., 2023; IDH, 2021). By shifting from beef to aquaculture, farms can release up to 90% of the pasture dedicated to beef production with only about 5% of that surplus pasture needed to replace income from beef. The remaining area of pasture can be returned to forest, tree crops and agroforestry systems, depending on compliance with Forest Code (SAVIANI, 2024; AMORIM & TOSTA, 2020). Furthermore this shift can be at least partially financed by selling carbon credits for the land converted from pasture to forest or agroforestry through access to the developing REDD+ jurisdictional carbon offset markets that state governments are now preparing to enter (VIRI, 2022; WOLF, 2013 CORBERA et al., 2011; UNEP).

**Certification Programs**:
A national certification program for tambaqui aquaculture has not yet been developed. However, EMBRAPA and other industrial groups recognize the importance of certification and see the foundation of genetic bases as the future for a tambaqui breeding program (SHIOTSUKI, 2023).
However, tambaqui producers have achieved international certificates for the export of tambaqui, such as Best Aquaculture Practices (BAP) (COSTA, 2023).

**Relevant industries**:

**Aggregators/Suppliers**

Zaltana Pescados, Ariquemes, Rondônia: https://zaltana.com.br/en/produtos/tambaqui/; Contato@zaltanapescados.com.br

Pescados do Vale, Rodovia 364, Linha C-40 - Ariquemes/RO
comercial@pescadosdovalero.com.br

**Exporters**:

Friolins, Manaus, AM Friolins Pescados Ltda. is located at: R. Duque de Caxias, 266 - São Francisco, Manacapuru - AM, 69400-380, Brazil., +55 92 3361-1425
Frigopesca, Manaus, AM

**Importers:**
Netuno USA, Ft Lauderdale: https://netunousa.com/

**Import/export tariffs and compliance**:

**CGEN/Nagoya Biocultural Rights and Protection concerns**:

**Regulatory Information**
INCI Name:
Harmonized System Code:
EINECS No:
CAS Number:

**Useful Reports**

PS.: For all conversions from Brazilian real (BRL) to US dollar (USD), an average of the values for each year was made (example: sum of the monthly averages for the year 2021, divided by 12. The result was taken with the value dollar average in 2021).
Table with monthly averages:
Year 2009: USD 1 ≅ BRL 2,11 (annual average).
Year 2018: USD 1 ≅ BRL 4,02 (annual average).
Year 2019: USD 1 ≅ BRL 4,16 (annual average).
Year 2020: USD 1 ≅ BRL 5,44 (annual average).
Year 2021: USD 1 ≅ BRL 5,90 (annual average).
Year 2022: USD 1 ≅ BRL 5,30 (annual average).
Year 2023: USD 1 ≅ BRL 5,18 (annual average).
Year 2024 (until April): USD 1 ≅ BRL 5,28 (annual average).