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Intelligence

Singapore company achieves a breakthrough in tropical eel farming by closing the lifecycle

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By Bonnie Waycott

Japfa Group enables captive breeding, reducing reliance on wild populations and supporting conservation efforts



JAPFA Group members measure an adult eel. The company has achieved captive breeding for the tropical eel (*Anguilla bicolor*), reducing reliance on wild populations and supporting conservation efforts. Photo courtesy of JAPFA Group.

Considered a high value species due to its demand in culinary markets across Asia and beyond, the tropical eel (*Anguilla bicolor*) is prized for its rich flavor and high nutritional content. But closed-cycle cultivation of the species has been impossible so far, due to its complicated and mysterious lifecycle.

Instead, farms rely on catching juveniles, or glass eels, and raising these to market size. However, this approach raises sustainability questions as it relies on wild populations already at risk from overfishing and habitat loss, among other threats.

Raising one of the most complex aquatic species in captivity might be a challenge, but **Japfa Group** (<https://japfa.com>), an industrial agri-food company in Singapore, has embraced it. Now, after several years working to safeguard tropical eel populations through aquaculture, the company has taken a major step forward.

In September 2024, Japfa Group member PT Suri Tani Pemuka (STP), which operates the Group's aquaculture business, and the Aquaculture Research Center (ARC) in East Java, Indonesia, announced that they had successfully achieved the first step in reproducing the tropical eel in captivity.



(<https://link.chtbl.com/aquapod>).

Their work underscores Japfa Group's commitment to sustainability and innovation, as well as the importance of collaboration between industry and academia in tackling the challenges of sustainable food production, according to Ardi Budiono, president director of STP, Aquaculture Division of Japfa Group.

"This project stems from two key drivers: Japfa's approach to protein production and the challenges associated with breeding eels," Budiono told the *Advocate*.

"We use the right breeds and farming methodologies within a vertically integrated approach – from feed to farming – to ensure the efficient and sustainable production of affordable animal proteins on a large scale in tropical climates. The tropical eel is seen as a viable substitute for the widely consumed *Anguilla japonica*, as its taste and texture are quite similar. There is currently limited market data specifically tracking the demand for tropical eel, but we see the species becoming an important alternative in meeting consumer demand, especially as awareness of sustainable sourcing increases across Asia."

Because eels travel thousands of kilometers from freshwater rivers to deep oceans, replicating the conditions for their reproduction outside their natural habitat is extremely difficult, said Budiono. Their production is notoriously complex and not fully understood, while there is a significant lack of knowledge of their physiological and biological aspects, in particular their breeding behavior in natural habitats.



A view of the JAPFA Group's indoor eel broodstock farm. Photo courtesy of JAPFA Group.

Using advanced techniques and rearing methods developed by ARC, the ARC research team successfully hatched 70,000 larvae, achieving larval rearing for 11 days. They also conducted a series of trials to perfect parameters such as water quality, temperature, diet and habitat conditions, making sure that they closely mimicked the species' natural environment.

This development has benefits for both conservation and aquaculture, said Budiono. The tropical eel is currently classified as “near threatened” on the International Union for Conservation of Nature (IUCN) **Red List** (<https://www.iucnredlist.org/species/166894/176494582>). Reducing farms’ reliance on the wild is a huge step forward in protecting wild populations while meeting the growing consumer demand for high quality, sustainable animal proteins. It is also a tangible contribution to advancing aquaculture technology, and a way of protecting other species of eel from threats like overfishing.

“An industry-wide transition to reproduce eels in captivity would reduce pressure on wild populations, enhance biodiversity and ecosystem health,” said Budiono. “Our work demonstrates the potential of large-scale tropical eel production. Going forward, we will continue to implement sustainable farming practices, conduct further research on the species and actively support efforts to enhance other eel populations in their natural habitats.”



American Unagi brings eel farming back ‘home’

Sara Rademaker launched American Unagi to shift eel farming to American soil, where the eels are from. Why? Because of the novelty, and because she saw an opportunity to do things better.



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The work has not been without challenges, however. One of the main hurdles was the lack of comprehensive knowledge about the reproductive biology and processes of tropical eel. This was overcome through meticulous research and trials, and the refining of key breeding parameters such as effective handling practices, diet and habitat conditions.

Looking ahead, the team will be fine-tuning its methods and conducting more trials to further enhance the efficiency and effectiveness of its eel reproduction techniques. While aiming to deepen its understanding of tropical eel breeding needs, its overall aim is to scale its operations toward large-scale commercial production and tackle the challenges of tropical eel reproduction. With positive feedback from the aquaculture community and knowing that their methods and technology could be applicable in other contexts, the team sees a strong future.

“We are optimistic about eel reproduction and farming, particularly for tropical eel, but while our work is a significant milestone, it is just the first step in a longer journey,” said Budiono. “By continuing our research, we want to support advancements in eel farming practices internationally. We also believe that our research has the potential to positively impact aquaculture and inspire collaboration and innovation across the sector for the benefit of a wide range of stakeholders.”

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Correspondent Bonnie Waycott became interested in marine life after learning to snorkel on the Sea of Japan coast near her mother’s hometown. She specializes in aquaculture and fisheries with a particular focus on Japan, and has a keen interest in Tohoku’s aquaculture recovery following the 2011 Great East Japan Earthquake and Tsunami.

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