

Atlantic Salmon in Ningbo: A Taste of Sustainability

Green China

By LONG Yun & ZHONG Jianli

According to legend, over 2,500 years ago, Fan Li, known as the *Sage of Commerce*, wrote the world's first book on aquaculture, "Treatise on Fish Farming," in what is today Zhejiang province in east China, laying a solid foundation for modern aquaculture.

Today, this ancient wisdom has found new expression in a pioneering project in Xiangshan, a county in Zhejiang's Ningbo city which produces Atlantic salmon right from the eggs, making them a unique land-based Atlantic salmon produced in China.

This April, locally farmed Atlantic salmon began appearing on the shelves of restaurants and supermarkets across the Yangtze River Delta. Known as the "king of fish," the Atlantic salmon is challenging to farm but prized for its tender, sweet flavor and high price.

Transporting the fresh fish to Zhejiang from Norway often takes several days after air transport, customs inspections, and domestic shipping. Now, the time has been drastically reduced.

According to Nordic Aqua, the Norwegian company behind this trailblazing endeavor, processed fish products can reach any part of the country within 24 hours. It takes only five hours to get to Zhejiang's neighboring megacity Shanghai.

Science and Technology Daily reporters went to Xiangshan to explore how the East China Sea has become the new home of the Atlantic salmon.

The story began over 10 years ago. Ove Nodland, one of the founders of Nordic Aqua, is a salmon enthusiast



Andreas Thorud. (PHOTO: S&T Daily)

who has been doing business in Ningbo for over two decades. He had a dream: after years of importing the Atlantic salmon, could he bring salmon farming to his "second hometown" Ningbo?

The natural conditions required for farming the Atlantic salmon are extremely stringent. Luckily, the ecological environment and geographical location of Xiangshan are perfectly suited to this dream of realizing a land-based Atlantic salmon project. Like Norway, Ningbo has vast sea areas, a great environment and a rich tradition of aquaculture.

"We've tested the local seawater and found it suitable for salmon farming after treatment," said Andreas Thorud, the Norwegian general manager of Nordic Aqua. "What we've achieved here would not have been possible without the support of the local government and community in Xiangshan and Ningbo."

In 2018, the Nordic Aqua (Ningbo) Company was established, starting Asia's first land-based salmon farming project using recirculating aquaculture system (RAS) technology. This project is unique not only in China but worldwide for its land-based farming system.

Walk into Nordic Aqua's farm in Xiangshan and you can see groups of the Atlantic salmon swimming in pools of clear, purified seawater. The fish eggs come from Iceland, each batch carrying a genetic certificate to ensure purity. After hatching, the fish grow in the farm's pools, taking about two years to reach the market standard. The farm uses RAS technology to draw water from the East China Sea, using advanced systems to simulate ocean conditions, maintaining clean water and a temperature of around 13 degrees Celsius, while replicating ocean currents to provide the best environment for the salmon to grow quickly and healthily.

Food safety is a priority. According to Thorud, the highly purified water means the salmon grow without requiring vaccines or antibiotics, allaying safety concerns. The company's salmon products have received praise from customers.

From latitude 70 degrees north to 30 degrees north, the fish from Northern Europe have found a familiar environment in Zhejiang, much like the company's management, who have integrated into China and its local community. "There are a lot of local talents in our factory, and we feel very much welcome. We share the pride by producing the Atlantic salmon in Xiangshan," Thorud said.

One month ago, Nordic Aqua held an auction for their Atlantic salmon products. "The money from this auction went to a local school, and we're delighted to give back to the local community," Thorud said. The local employees also have a sense of achievement from learning this unique aquaculture.

This year marks the 70th anniversary of diplomatic relations between China and Norway. One of the most compelling aspects of this cooperation is their joint commitment to sustainable development. Nordic Aqua is a shining example of China-Norway cooperation in marine sustainability.

With continued efforts and a shared vision, the future of green development in the ocean and energy sectors holds great promise. "We look forward to increasing our capacity here, contributing to the local economy, and supporting the government's goals of modernizing aquaculture," Thorud emphasized.

This article is also contributed by the Ningbo Science and Technology Bureau.

Letter to the Editor

How China Built Impressive Higher Education Environment

By Md. Altab Hossin

In parallel with economic growth, higher education is playing a vital role in China, driving the progress of science, technology, innovation, and social development by nurturing talents. They will contribute to real-world applications of new technology in different sectors and thus to society as well.

China has established a wide range of higher education institutions in every region to foster a quality academic environment with modern infrastructure, experienced teachers, and advanced lab facilities. For example, Chengdu in southwest China has seven "double first-class universities" — universities that are world-class with first-class disciplines, which makes it a cradle of talents and quality research.

Chinese institutions among global top universities

By utilizing their academic resources and engaging in research, Chinese higher education institutions are gradually securing more prominent positions in the world and playing a vital role in the field of science and technology. In 2024, 31 universities in the Chinese mainland ranked among the top 500 universities in the world, including four universities that were among the top 50, according to the Times Higher Education World University Rankings.

In 2022, according to Nature Index, which tracks the affiliations of high-quality scientific articles, China ranked top in the volume of natural science research papers published in the most significant journals. In 2023, China came second in the number of highly cited researchers with a total number of 1,275, consolidating its place as a star in academia.

Academic ecosystem of research and innovation

Giving full play to science and technology, and the knowledge of academicians, talented personnel, and other experts, China is building a research and innovation-oriented ecosystem of academia. Science parks, incubators, and high-tech enterprises are providing higher education institutions with convenient research collaboration, training bases, and practical-oriented teaching so that scientific research outputs can be smoothly trans-



Md. Altab Hossin. (COURTESY PHOTO)

lated into real productivity.

China is also organizing various innovation and entrepreneurship competitions to encourage and enhance the creativity of college students, and turn their project ideas into real productivity by providing them knowledge-based incubator support and connecting them with investors and industry chains.

Incubator for international students

The higher education institutions in China are also active in international cooperation and exchanges. This is done by not only fostering quality students and sending them abroad, but also coming up with policies to bring back Chinese graduates from abroad.

Foreign students in China, besides learning the Chinese language and culture and taking professional courses, can enjoy a peaceful campus environment and quality research under the guidance of experienced advisors. All this helps them to learn and grow their careers smoothly.

China has now become a leading provider of academic environment for foreign students and talented individuals. All higher education institutions welcome such people to pursue their higher education and research collaboration in China, so as to jointly promote science, technology, and the economy, not just in China but worldwide.

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Sijiaoping Site: A Window into Chinese Civilization

Traditional Eastern Wisdom

By ZONG Shihan

As one of China's top 10 new archaeological discoveries of 2023, the Sijiaoping site is located in Lixian county, Gansu province. This is a rare architectural site related to sacrificial rites of the Qin Dynasty, revealing the formation of early Chinese civilization.

The Sijiaoping site sits atop a mountain in Lixian, with its outer perimeter fortified by rammed earth walls following the natural contours of the terrain. Inside, it is primarily composed of multiple rammed earth building foundations. Among them, the central rammed earth platform has a side length of approximately 27.8 meters. In addition, there is a drainage system around the building.

Artifacts unearthed at the Sijiaoping

site are mainly architectural components, including eaves tiles, flat tiles, tubular tiles and hollow bricks. These components are laid out in different positions of each building according to unified specifications and patterns, demonstrating a systematic production standard. Based on the characteristics of the building materials and the manufacturing techniques, experts have inferred that the Sijiaoping site artifacts should belong to the cultural relics of the Qin Dynasty.

From the known archaeological excavations, the traditional form of the Zhou Dynasty ancestral temples featured a walled compound with three distributed buildings within the compound, while the Han Dynasty ancestral temples exhibited a characteristic of nested distribution. According to historical documents, the temples of the Han emperors were largely similar in form and inherited from the Qin Dynasty.

Therefore, the nested planar layout of the Sijiaoping site may serve as a physical example of the inheritance of this cultural system.

Taking the Sijiaoping site as a model, after unifying the six kingdoms, Emperor Qin Shi Huang created a unified sacrificial tradition for China's

multi-ethnic nation. This tradition was inherited and developed in ancient ritual architectural complexes such as the Yangling Mausoleum of the Han Dynasty and later the Temple of Heaven and the Temple of Earth, vividly demonstrating the continuity and innovation of Chinese civilization.



The eaves tiles unearthed from the Sijiaoping site. (PHOTO: XINHUA)

Prolonged Sitting Leads to Body Rusting

Science Outreach

By ZHANG Yingxian & ZONG Shihan

Generally, sitting for more than 30 minutes at a time is considered prolonged sitting. For many office workers and students, prolonged sitting is often inevitable, but it can give rise to issues like lumbar, cervical, and cardiovascular diseases. So, what effect does prolonged sitting have on

bones and how can people perform stretches to alleviate stiffness?

If the human body maintains the same posture for a long time, the fascia, muscles, and joints will suffer pain due to lack of lubrication, which can be precursors to bone problems, said Sun Yueli, deputy chief physician of Longhua Hospital, Shanghai University of Traditional Chinese Medicine.

Fascia, a tissue covering the surface of muscles, serves a lubricating function. However, prolonged sitting can cause the fascia to lose water and become dry, leading to adhesions and pain. Muscles promote microcircula-

tion through contraction and diastole. Under prolonged sitting, muscles often contract without relaxing, resulting in stiffness at a fixed length. Over time, muscles can become inflamed, causing tightness and pain.

In addition, the joints in the human body can secrete synovial fluid, which has a lubricating function. However, with prolonged sitting, the joints can become like rusty gears lacking lubrication, easily causing clicking sounds.

Sun recommends performing reverse stretching exercises to quickly alleviate stiffness caused by pro-

longed sitting.

Reverse stretching exercises involve sitting with both hands akimbo, pressing down with the right hand to lower the right pelvis and raise the left pelvis, while extending the head upwards and keeping the upper body upright. In addition, after holding this position for 3 seconds, you can change direction and repeat it 10 times.

This exercise can activate the muscle groups surrounding the pelvis and lumbar spine, promote blood circulation, and help prevent stiffness in the joints and muscles, according to Sun.

Innovation for Sustainable Development of 'Blue Granary'

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Also impacted by the tide of the global digital economy, the ocean is entering the era of digitalization and intelligence. With the rapid advancement of intelligent ocean construction, 5G, BeiDou Navigation Satellite System, Internet of Things, AI, big data and other new information technologies are widely used in marine fisheries, maritime safety operations, offshore aquaculture,

the petrochemical industry, ports and other fields.

In the marine ranch complex in Yantai, Shandong province, the combination of aquaculture and marine tourism has created a new development model of "blue granary plus blue cultural tourism," and for the first time in China, aquaculture, intelligent fisheries, leisure fisheries, and sci-tech R&D are integrated on the same platform.

China's Low-orbit Broadband Satellite Internet in Thailand

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To put it simply, internet communication via the GalaxySpace satellite constellation is more efficient compared to using internet from smartphones utilizing 5G technology in Thailand, which typically reach maximum download speeds of around 175 Mbps, upload speeds of about 23 Mbps, and latency of approxi-

mately 28-34 ms," said Pookaiyaudom.

This cooperation provides a platform that local enterprises and universities can use to research low-orbit satellite communication systems, and helps boost the development of Thailand's related technological capabilities and application scenarios, said Liu Chang, vice president of GalaxySpace.