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GIFT tilapia raise culture efficiency in Sri Lanka

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Fish account for up to 70% of animal protein consumption in the country

The introduction of the GIFT strain to Sri Lanka has had positive social and economic impacts on farmers and their communities.

The genetically improved farmed tilapia (GIFT) strain of Nile tilapia (*Oreochromis niloticus*) has been developed by the WorldFish Center (formerly known as the International Center for Living Aquatic Resources Management) with assistance from national research partners in the Philippines and Norway (1988 to 1996) and Malaysia (2000 to present). After more than 10 generations of selection, the fish show fast growth, high survival rates, high fillet weights, good flesh quality, disease resistance and good adaptation to various farming systems.

To date, the GIFT strain has been formally disseminated to 14 national government agencies, and it is being widely cultured in many Asian and Latin American countries. In the Philippines, GIFT and GIFT-derived strains account for about 75 percent of total tilapia production.

Broodstock development program

Recently, the WorldFish Center has been implementing a broodstock development program in collaboration with the National Aquaculture Development Authority (NAQDA) of the Ministry of Fisheries and Aquatic Resources of Sri Lanka.

One component of this project consisted of the introduction and further improvement of the performance of the GIFT strain in Sri Lanka. The breeding program involved the transfer of 50 GIFT families with 20 to 30 fish per family from the latest generation of selection in Malaysia to NAQDA's Dambulla Breeding Center.

A cohort breeding design, in combination with rotational mating of males, has been practiced since 2007. So far, the GIFT fish have undergone four generations of selection for increased harvest weight in Sri Lanka.

Performance

In 2009 and 2010, the authors conducted on-farm field tests to evaluate the performance of GIFT fish relative to the locally available tilapia under three prevailing culture environments: earthen ponds, seasonal tanks and minor perennial tanks. Across the environments, the GIFT strain had about 112 percent greater growth than the local strain (Fig. 1).

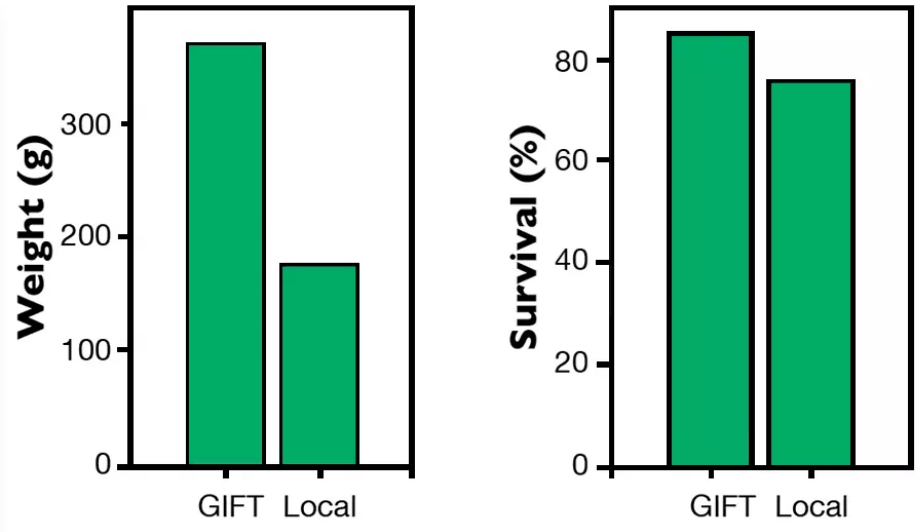

Fig. 1: Growth and survival of GIFT strain and local tilapiain Sri Lanka.

Survival from stocking to harvest was also significantly greater in GIFT tilapia – 85.4 versus 75.5 percent for the local fish. A similar result was found under cage culture in Vietnam, where the GIFT strain reportedly had 70 percent greater growth rate than farmers' existing stock.

One of the concerns often expressed about improved strains such as GIFT is that they may perform well in favorable environments but not in harsher ones. The environments the authors have studied ranged from relatively good (station and farm ponds) to intermediate (seasonal tanks) and rather harsh (perennial reservoirs). GIFT performed well above the local

strains in all cases.

Dissemination to producers

Because of the GIFT strain's superior growth and survival rate, the authors designed a national breeding structure to multiply and disseminate the improved fish to end users in Sri Lanka. The classic hierarchical structure includes three tiers: national breeding centers, where the nucleus is kept and the genetic improvement program is implemented; a network of hatcheries that receive broodstock from the nucleus, multiply them and disseminate fingerlings to producers; and the production level of farmers growing out fish to market weights.

A network of about 30 hatcheries disseminate, GIFT fingerlings to producers.

Thus, the improved fish resulting from the breeding program are being multiplied and transferred to a network of hatcheries in the country. They in turn produce high-quality seed and distribute it to farmers and community-based organizations. In some instances, fry are also distributed directly from the nucleus to fish producers. Currently, about 30 hatcheries have received the improved fish. A total of 230 community-based organizations and farmers have received GIFT.

The introduction of the GIFT strain to Sri Lanka has had a large impact on farmers, increasing their income through the culture of faster-growing and better-surviving fish. The GIFT strain is now preferred to the local stocks in culture systems across the country.

As a consequence, the project is expected to have positive social and economic impacts on the communities, improving the living standards of poor people and contributing to gender equality via the creation of employment for women in rural areas of Sri Lanka, where the percentage of women involved in the sector is 10 percent.

Perspectives

The GIFT project has contributed to the increases in inland fisheries and aquaculture in Sri Lanka. In 2000, only 10 percent of the country's fish production came from inland fisheries and aquaculture. The proportion of production increased to 13.5 percent in 2010. The increase in freshwater fish production was from 36,700 to 51,390 metric tons during the same period.

The development of aquaculture in Sri Lanka is particularly important, since fish account for up to 70 percent of the total consumption of animal protein in the country. There is high demand in rural and urban markets for freshwater fish to alleviate malnutrition and poverty, especially in the inland areas of Sri Lanka.

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