Tilapia—The Aquatic Chicken

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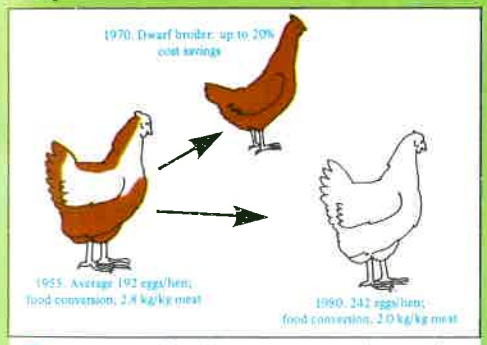
A combination of technology and genetics has transformed the poultry industry into a highly complex business over the past thirty years. Tilapias are likened to chickens because the latter, unlike other major animal food commodities, can be mass produced from eggs, intensively farmed in tiers in three-dimensional "batteries" and can convert plant products into animal protein at a very efficient and economical 2:1 ratio. Tilapias, like chickens, are a source of low-priced animal protein. Both can be farmed highly profitably in a variety of situations from backyard enterprises to high-technology systems; both can be marketed in a variety of value-added products.

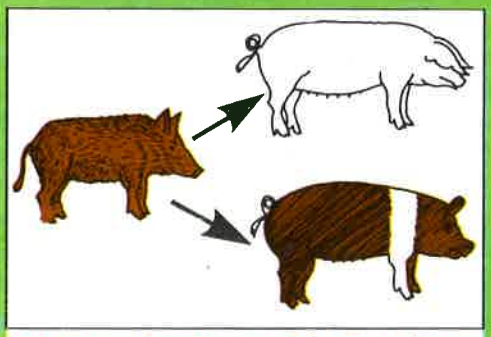
Some comparisons with other food commodities are also worth making to show the remarkable developments in tilapia farming in recent years.



Recent genetic improvements in poultry strains include better egg production and food conversion; superior dwarf strains are becoming popular.

Pork production has also changed from backyard-style operations to an intensive industry over the past 30 years. Modern breeds, such as the Landrace and Hampshire, were developed from the European Wild Boar and these breeds provide seed stock in most developed countries for crossbreeding programs that supply almost all the production. Strict records of genetic identity of the seed stocks are kept! Crossbred pigs show improved survival, growth and food conversion.

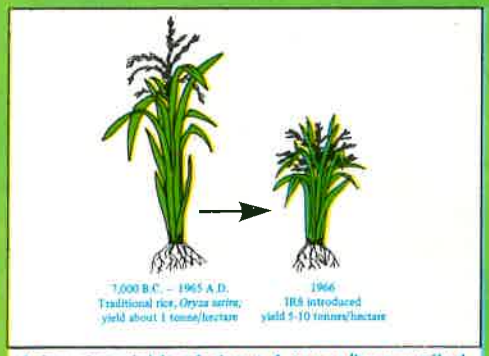
Yields of the most important Asian food crop, rice, did not improve from 7,000 years ago, when farming began, until the mid-1960s, when a new semi-dwarf variety, IR8, was introduced. It was the first of many new varieties developed at the International Rice Research Institute in the Philippines; subsequent varieties have exhibited further quick-growing and pest-resistant qualities. The Institute's genetics program involves over 4,000 crosses each year. As a result, some Southeast Asian countries have produced more rice in the past 16 years than in all the preceding 7,000 years.



Modern pig breeds, such as Landrace *(upper right)* and Hampshire *(lower right)* come from the European boar *Sus scrofa (left)*. Selective breeding is providing continuous improvements in productivity.

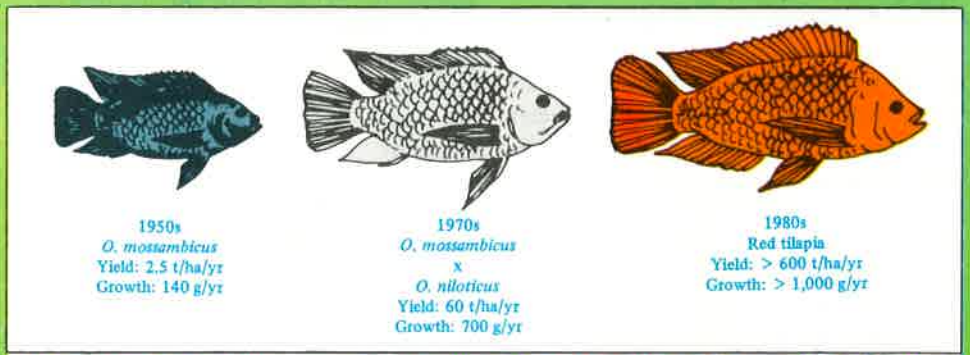
Comparing the genetic and technological improvements in production of these commodities is quite difficult. However, while productivity in the poultry and pork industries has recently increased by a factor of 2 and the new Asian rice, with potential of improving farm yields by a factor of 10, has unreservedly been called "miracle rice", how then do we describe tilapia, a commodity which, in a similar time period, has improved in potential productivity by a factor of not 2 or 10 but by a factor of 100?

Tilapia yields of 600-800 tonnes/hectare/year are now attainable as a result of early genetic research coupled with intensive farming technology. However, water volume is more critical than surface area in such systems.



Asian rice yields of about 1 tonne/ha prevailed until the introduction of IR8, a semidwarf variety yielding up to 10 tonnes/ha.

Yet serious genetic work on tilapias is only just beginning, thirty years behind poultry and pigs, and twenty years behind Asian rice. Thirty years ago, world tilapia production through aquaculture was probably less than 20,000 tonnes. By 1983 it was probably about 200,000 tonnes, with four Asian countries alone (Taiwan, Thailand, the Philippines and Indonesia) accounting for 180,000 tonnes. Given the growing popularity of tilapia, it is now feasible to project that even using present research results, annual world aquacultural production of these fish can attain 2,000,000 tonnes. •



The potential for genetic improvement in tilapias is enhanced by their ease of hybridization. *Oreochromis mossambicus*, the Java tilapia, was the first tilapia species to gain an international reputation. Yields, appearance and growth rates were poor. *O. niloticus* was better, but showed faster growth crossed with *O. mossambicus* or with *O. aureus*, blue tilapia; the latter cross also gave all-male offspring. *O. niloticus* crossed with albino *O. mossambicus* gave rise to a fast growing red variety, which came into commercial production in the late 1970s. Other hybrids and sex-inversed stocks of *O. niloticus* now give comparably high yields.