

Virginia's spawnless oyster: traditionally bred, not genetically modified

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Triploid (or spawnless) oysters are not “genetically modified,” that is, they are not a GMO.

Go into the grocery store and the overwhelming majority of items you buy will be modified from their original “wild” state. No one calls them genetically modified if they have come about by traditional agriculture techniques developed over centuries by selective breeding. So it is for oysters, which have also undergone selective breeding and, for most grown in Virginia, another transformation to take away their reproductive capacity – so-called “spawnless” oysters, technically known as triploid.

Traditional selective breeding in agriculture started at least 10,000 years ago when humans started raising crops and livestock in conditions that were more or less controlled — in caves, corrals, pens, ponds, fields. The species that have best accommodated to that level of control have become commodity crops: cattle, chickens, corn, wheat and hundreds of other previously wild species. We refer to this process of taming wild species as domestication.

In the last 400-500 years, selective breeding has been applied to crops and livestock, and later aquatic species, to gradually improve products to feed people more efficiently. The systematic use of genetics had to wait for the late 19th century, when laws of heredity were discovered.

In these ways, all agriculture crops and many in aquaculture have been “modified” from their wild state in genetic ways.

With the advent of the molecular technology in the late 20th century, customizing agricultural species became more sophisticated, allowing breeders to excise genes or portions of genes and transplant them to new locations, often from one species to another. This has become especially pronounced in plant breeding and is now commercially practiced in crops like soy beans, corn, cotton, alfalfa, tobacco, tomato, rice, etc.

These modern molecular techniques of modifying plant and animals entails the *literal* meaning of genetically modified organism: one whose genetic material has been changed using genetic engineering, which is a technology that relies on recombinant DNA (artificial DNA moved from one place to another), also known as gene splicing. In short, recombinant DNA methods are not traditional methods of breeding.

Although the oyster that the aquaculture industry uses is decidedly not wild, all of the changes it has undergone during domestication for aqua farming are time honored and traditional agricultural methods. One of those methods is standard selective breeding, using the genes naturally available in the wild oyster and enriching them by choosing the best offspring as broodstock for the next generation. Oysters have also been subjected to another traditional breeding trick called chromosome set manipulation, or polyploidy. Just like oysters in many other parts of the world, including France and Australia where genetically modified oysters are not permitted polyploids – especially triploids – have been produced to enhance farmed oysters. This technique essentially supercharges the number of chromosomes contained in each cell, thereby – in most cases – supercharging the performance of the oyster on the farm. The beautiful thing about creating these “spawnless” oysters is that it is done by the simple process of crossing one oyster with another in the hatchery. There are no processes, no chemicals, no additives, no genes that don't belong, no drugs, no hormones. In short, the extra chromosomes belong to the oyster, they simply do not occur naturally in such numbers. The benefit comes from the fact that oysters spend a great deal of their energy reproducing and become weak and vulnerable during and following spawning. Take away the burden of reproduction, and they thrive on the farm.

Making a spawnless oyster is akin to the genetic manipulation commonly done for blueberries, watermelons, apples, strawberries, potatoes, etc. None of these is “genetically modified,” that is, considered a GMO because of this condition of many chromosomes. Similarly, the farmed oyster is made up of more of its own stuff, rearranged for the benefit of the farmer, and, ultimately, the consumer who enjoys a better product.