

Learning by Failing?

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Editorial

Brown trout (*Salmo trutta*) is the most widely distributed fish species in freshwater environments. From a limited European natural distribution range, humans successfully introduced the brown trout to freshwater locations on all continents. This was done at a time (before 1900) when knowledge of parasites and pathogens were limited and so the release of fish in various environments could be excused. A favorable factor in earlier day's transport of living organisms were that transportation took time and often fertilized eggs were the preferred stage to transport. This reduced the probability of unwanted organisms to hike.

Today, we transport all kinds of organisms we use in aquaculture production, freshwater or sea-water. This transport is done fast and all live stages of our focal species are usually involved. This leads to a spread of parasites and diseases which are more efficient than our predecessors across continents and natural barriers. Atlantic salmon (*Salmo salar*) from northern Europe were transferred for aquaculture production across natural barriers like equator to e.g. Chile and across the American continent to the Pacific Ocean. The history of Nile perch (*Lates nilotecus*) introductions into African lakes is a classic case. This was done in modern time and both parasites and diseases are successfully transferred along with the fish.

An illustrative example is a small transport of live Swedish Atlantic salmon smolts to a Norwegian aquaculture plant which also cooperated with wild salmon culture interests. The salmon parasite *Gyrodactylus salaris*, originating from Sweden, has so far infected over 40 Atlantic salmon producing rivers in Norway. To eradicate the parasite, Norwegian interests have spent more than 100 million US-dollars in rotenone treatment and restocking of earlier infected rivers. The costs for Norwegian society is far larger, due to the high interest for sport fishery after Atlantic salmon and which is nonexistent in *Gyrodactylus salaris* infected rivers.

Modern agriculture in many areas has a great benefit from a pest- and parasite-free environment. Production can be performed in monocultures and be increased with a predictable yield. Disease and parasite control is an important part of modern agriculture and western countries have a strict legislation to keep pest organisms under control.

Also for aquatic production we must seek to keep the environment healthy for future generations, avoid escapes and introductions of our focal aquatic organisms as well as their pathogens and/or their parasites. This is especially important when organisms are transplanted outside their natural area of distribution, as they potentially can evolve in a pathogen and parasite environment.