

## NEW SPECIES

# Burbot – a new candidate for cold water aquaculture

A German hatchery explores prospects for commercializing a freshwater fish which tastes a lot like American lobster

BY VELO MITROVICH

Burbot (*Lota lota*) are found in the wild across the northern hemisphere above 40° latitude, mostly in streams, in North American and Europe. Referred to in Canada and the USA as 'the poor man's lobster,' this carnivorous fish is the only freshwater gadiform species, i.e. related to cod, ling, cusk, etc.

Depending on where it is found, it is also called an eelpout, freshwater cod, lawyer, loche or ling. Unlike salmonids, the burbot is not noted for its grace or beauty, looking like a cross between an eel and an American catfish.



Broodstock burbot. Individual fish average ... cm long.

The body is elongate, almost eel-like, with long, soft-rayed dorsal and anal fins that meet in a rounded tail fin. The skin is smooth and slimy to the touch, and is embedded with very small, cycloid scales. The head is broad and somewhat flattened. The large mouth contains several rows of small teeth on the jaws. A single, whisker-like barbell protrudes from the tip of the chin. While the largest on record weighed 11.4kg – about 25lbs – most mature burbot weigh around 1-3kgs (2.2-6.6lbs) and range in size from 40 to 60cm (1.3-2ft).

#### SMALL COMMERCIAL FISHERY

There has never been a large commercial fishery for burbot and even that has declined owing to a decrease in abundance of wild stocks. Commercial fisheries for burbot are found in Russia, Sweden, Finland and other Baltic countries, and while a much smaller fishery exists in the North American Great Lakes, burbot are not usually the targeted species.

In Canada and the United States, burbot are more commonly caught by sports fishermen. Burbot is considered an excellent food fish due to its tasty, white, low-fat and boneless meat. In addition, burbot roe and liver are appreciated as delicacies. Burbot liver has a much higher content of vitamins A and D than does that of cod (*Gadus morhua*). A market study in Germany found that burbot could obtain middle – to high market prices.

#### EXCELLENT CULTURE CANDIDATE

In the past, much of the development aimed at culturing burbot has come about through restocking efforts, however, it is now being promoted in Germany as a farmed species. This will likely spread to other countries as consumers discover its distinctive taste. According to those involved in farming burbot, it has a feed conversion ratio of 1:1 and can reach market size in 1.5 to 2.5 years depending on year-round water temperature. This time frame can be reduced by about a year if 10g fingerlings are used as stock. The preference of this benthic and nocturnal species for cold water temperatures makes the burbot an excellent candidate for inland cold water culture and could enable growers to diversify their product lines.



Incubating eggs in Zuger jars.



Newly hatched burbot larvae in Zuger Jar.

#### GROWOUT PRODUCTION

According to Firzloff, potential customers for burbot fingerlings will receive professional advice for on-growing during the entire production period. This includes, for example, consultation for design and construction of the production facility (Billund Aquaculture Service, Denmark, and aquaFUTURE e.K, in Germany, can provide this service), as well as recommendations about husbandry conditions, feed management, and production processing.

Wocher says that the aim of an economic production of farmed burbot

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Larvae are fed on newly hatched Artemia

should be a final fish weight of 400-500g (around one pound) prior to onset of sexual maturity. In this case, fillet yield and liver content of 40 and 10% respectively are possible. The prerequisites for year-round production of burbot are water temperatures of 10-16°C (50-60°F), the use of covered tanks and automated feeders, as well as constant good husbandry conditions.

Burbot fingerlings for restocking or re-introduction programs can also be



Burbot meat and liver showing the lobster-like flesh colouration.

produced at *LOTAqua*. These will be bred from broodstock taken from individual river systems, to ensure genetic integrity. For stocking programs in the Rhine River System, an autochthonous broodstock already exists.

For more information contact Hendrik Woher at: [www.trueschenzucht.de](http://www.trueschenzucht.de), or Dietmar Firzlaff at: [www.aquafuture.de](http://www.aquafuture.de)

*All photographs courtesy Dietmar Firzlaff*

## Burbot in the hatchery

Fishery biologist Hendrik Woher, who has run a private hatchery (*LOTAqua* hatchery) in Germany since 2012, has managed a pilot project for the last six years examining the potential of burbot culture through the entire production cycle. Additionally, a 10-year practical research project was conducted by aquaFUTURE e.K., which looked at how to optimise burbot farming. The preliminary findings will enable interested farmers with the necessary tools to start-up a commercial burbot farm.

Fingerling production at the *LOTAqua* hatchery runs from April to September and is based on a natural spawning broodstock, which has been selected for growth and sexual maturity. The broodstock consists of F2-fish from wild caught burbot, which were reared on commercial feed for two years and subsequently on live fish.

Burbot eggs are obtained by natural spawning in tanks. After siphoning from the tanks, the eggs are transferred into Zuger jars for incubation. After hatching, the larvae are fed under continuous light (24h/day) with newly hatched *Artemia* by an automated feeding system.

After four weeks, weaning onto a commercial diet is started, again by automated feeders in 24h continuous light. Fingerlings are fed with granulated feed in covered tanks to a weight of 10g prior to sale. Other sizes will be available in the future.

"Right now we are feeding the young fry on *Artemia*," says Hendrik Woher. "Burbot are very aggressive feeders – especially in cold water – and can be cannibalistic. You need to make sure they have plenty of food and when you move them over to commercial feed, make sure the feeding machines are working every day."

Depending on the stocking density of the young fish, burbot should be sorted according to size to avoid cannibalism. "Like most carnivorous fry and fingerlings, as long as you feed them right, watch the stocking density and sort by size, you will not have any problems," says Firzlaff. "As of yet no feed manufacturer is making feed specifically for burbot and we are researching which formulation works best for them," he adds. Growing conditions for young burbot are similar to those for trout in regards to water quality and oxygenation.