

CERES storyline - carp in North-East Europe

Will carp be effected from climate change?

Common carp (*Cyprinus carpio*) is a broadly reared species, specifically in Middle and Eastern Europe. The traditional production of carp is conducted in earthen ponds, which can be harvested every 2-3 years depending on thermal conditions. Fish of different market sizes from 600 g (Ukraine, part of Poland) to over 3 kg (Czech Republic, Bavaria) are produced, depending on local traditions and markets. As production takes place in naturally-occurring earthen ponds, and fish are predominantly fed with cereal feed, with a significant share of natural food, carp production is highly dependent on climatic conditions.

Carp as grows well in water temperatures above 20 °C. However, further increase in water temperature (for commercial fish over 28 °C) leads to inhibit the growth of fish. Therefore, any climate change that are the results of the increase in average water temperatures affects the conditions of production.

Our aim in CERES is determine the potential impact of climate change on environmental condition and potential of growth carp production in European countries.

What will be the challenges for carp farming in the future?

The traditional production of carp in the earthen ponds is well described and recognized. The practice developed from the Middle Ages where monks established the first large carp farms in eastern Europe. Today, after the recent significant innovations at the turn of the 19th and 20th centuries by Tomasz Dubisz, the European system of carp production in ponds has been established.

However, depending on the development of the carp market, new challenges may emerge.



The most relevant barriers and challenges affecting the growth of this sector are:

- increased competition from other aquaculture species
- direct and indirect effects of climate change on the production (growth, new diseases)
- increased cost of water using
- disease management especially problems with viral diseases such as KHV (Cy-HV3)
- predators under government parasol (for example otter, beaver, cormorants)
- unregulated supply and demand causing imbalance in the market and reduced profitability
- predominance of big-scale farmers
- lack of co-operation amongst local/international producers & between government and industry on R&D
- lack of product differentiation and development – special traditional market with live fish versus processed fish
- lack of coordinated national strategic plan for aquaculture and poor industry administration
- lack of strategy of development new methods of production of carp (aquaponics systems etc.)

Carp production, FEAP report 2016

SPECIES	COUNTRY	PRODUCTION (tons)									
		YEAR									
		2007	2008	2009	2010	2011	2012	2013	2014	2015	
Common Carp	POLAND	15,698	17,150	18,300	15,400	14,400	16,500	17,700	18,000	18,000	
	CZECH REPUBLIC	17,947	17,507	17,258	17,746	18,198	17,972	16,809	17,833	17,860	
	HUNGARY	9,570	10,485	10,500	9,927	10,807	9,985	9,632	9,800	10,461	
	GERMANY	10,500	10,500	9,000	9,783	5,082	5,521	5,700	5,285	4,916	
	FRANCE	6,000	6,000	6,000	4,000	3,500	3,500	3,500	3,000	3,000	
	CROATIA	1,503	1,546	2,058	1,816	2,891	2,484	2,100	2,100	2,100	
	ITALY	750	750	750	700	750	750	700	700	700	
	AUSTRIA	346	362	344	348	596	590	619	573	573	
Common Carp Total		62,314	64,300	64,210	59,720	56,224	57,302	56,760	57,291	57,610	

What is the economic value of this fishery?

Most of carps are produced by aquaculture. The EU is very small producer worldwide (only 1,38 % of world production). The trade between the EU and third countries is very limited. Main producers in the EU are Poland, Czech and Hungary. Total production of carp was in 2014 only 57 291 ton compared to 4 159 117 ton (fao.org) in the World. Climate related change is expected to affect production yields. This change can provide two shorter cycle of production and moving production to north of Europe, but because of tradition not out of typical "carp countries".

What are the challenges?

Further development on carp aquaculture in Europe requires that knowledge gaps are covered in the future:

- Projecting the impact of climate change on carp production based on current data is expected to be accompanied with a great uncertainty, thus higher data collection is needed to assess the direct and indirect effects of climate changes on common carp.
- Overcoming the barrier of demand, intensive methods of breeding this species are needed. The prospect is to link RAS systems using agricultural post-production water (eg. Aquaponic).
- The traditional farming technology is limited by the lack of new places to build ponds. At present legal

regulations are unfavorable for the development of traditional carp breeding farm, and it largely corresponds to the so-called small water retention in significant areas of Eastern Europe.

- It is necessary to develop new innovative carp products that can increase the demand for this species.
- Significant threats to virological diseases in traditional breeding methods require the development of new, effective ways of combating viral diseases, eg. by introducing genetically resistant carp lines to specific viruses.

What is the working program in CERES?

The effect of temperature on growth, survival and stress biomarkers of farmed carp in different rearing conditions will be studied.



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