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## EUROPEAN CATFISH (*SILURUS GLANIS L.*) PRODUCTION IN FAMILY-SIZE FARMS

FERENC MÜLLER FISHERIES RESEARCH INSTITUTE, SZARVAS  
TIBOR MÜLLER MAGNOR LTD. CO., SZARVAS

The development of market economy in Hungary and the reorganization of the large-scale farming - including the privatization program - results the formation of small and medium size of family-farms. In this subject this essay helps the farmers to establish fish farm where there is irrigation water and thermal water available but the suitable land for fish pond construction is limited.

Besides fish farming the family can be occupied in other agricultural activities as well because the fishing does not occupy their working time. This type of farm existing in Nederland.

**The main characteristics of a family size farm are as follows:**

**Advantages:-** no constitutional organization,

- less authorization,
- no administration costs,
- the more income used by the family because until 750000 HUF of gross income there is no tax and up to 2 million HUF there is income-tax on 10-35 % of the total sale,
- the production can be adjusted to the market situation easily,
- the farmer organizes his work himself according to the market requirements.

**Disadvantages:**

- more difficult to get credit,
- to get loan the farmer has to raise a mortgage on his personal property,
- less capital is available for investment,
- because of the small size less the development possibilities,
- the buyer's liquidation problem can cause a crisis,
- there is no guaranteed market for small quantity.

For our calculation the result of Fisheries Research Institute's investigations and the MAGNOR Aquaculture Development Co.'s experiences were used obtained between 1991-93. During the past years we have experienced that the storing of small size of catfish (10-420 g/pc) caused 30-50 % of losses in winter time. These losses can be eliminated by rearing them in thermal water during the cold periods. This sort of investigations were undertaken in the recycling system of the Institute by using thermal water in winter time (by Ruttkay, Litkei, Kolyvek, Krasznai, Olah, Ronyai and Szabo), as well as at the Arpad cooperative of Szentés where plastic basin was used (by Kepenyés, Bercsenyi, Dankó).



## EUROPEAN CATFISH (*SILURUS GLANIS L.*) PRODUCTION IN THERMAL WATER BASINS

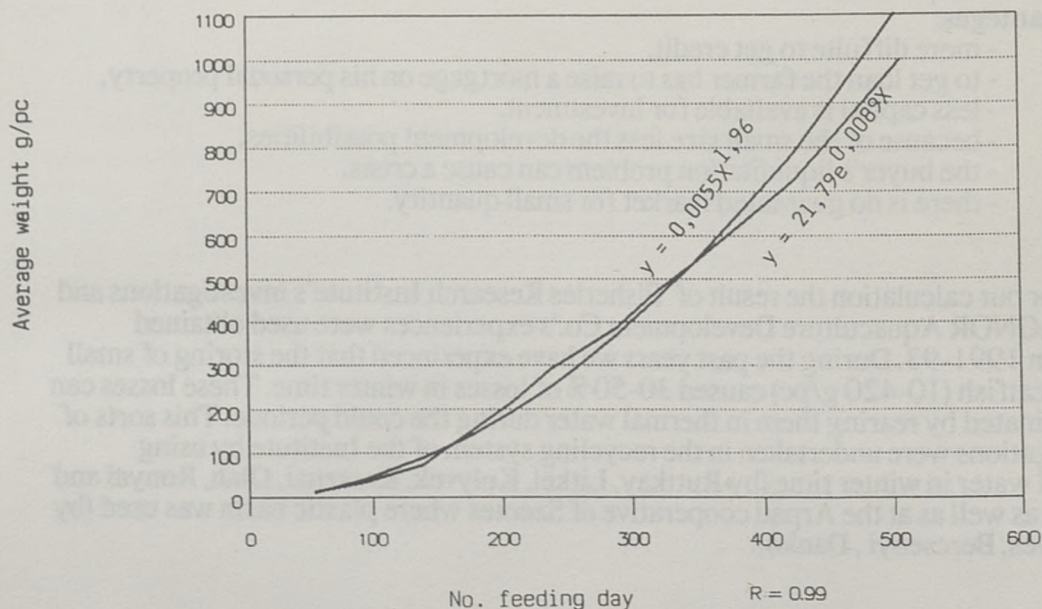
In the thermal water basins we put the catfish of 14 g/pc on the 14th of October 1991. The water temperature was between 22-24 °C and the pH 8.3-8.7 with a continues water flow. The average oxygen content was around 6.1 mg/l and by this water flow the total quantity of water was changed twice a day. The fish feed was a special catfish feed, prepared by the Institute. At the early stage we used TAGGER G-15 granulated feed too. The daily feed consaption was 1-3 % of the body weight., The fish was fed 6 times/day.

### The data of catfish growth

No.feeding day	Average weight g/pc hatching-time
0	14
52	34
94	73
139	146
174	217
208	291
237	325
255	389
290	472
321	534
348	725
424	1000

The product was sold above 1000 gr/pc after 508 days.

### Growth function of catfish production





There is a very closed connection between the age and average weight by using exponent function ( $R = 0,99$ ).

### EUROPEAN CATFISH (*SILURUS GLANIS L.*) IN SMALL EARTH POND

The investigation has been undertaken in an earth pond of 0.4 ha with 1.7-1.8 m deep water. This small pond can be charged and drained quickly. The fish was put in the pond in the middle of April with the following species:

Common carp II.	2250 pcs/ha	250 g/pc	562.5 kg
Catfish II.	1750 pcs/ha	600 g/pc	1050.0 kg
Chinese carp	50 pcs/ha	250 g/pc	12.5 kg
Silver carp	500 pcs/ha	85 g/pc	42.5 kg
<b>Total</b>	<b>4550 pcs/ha</b>		<b>1667.5 kg</b>

They were fed two times/day using feeding tray. The feeding rate was 3-4 % of body-weight/day. 55.9 % feed consumption was catfish-feed and 44.1 % was carp feed.

The prescription of	catfish-feed	carp-feed
dry material	86.0 %	86.0 %
protein	48.0 %	25.2 %
fat	8.9 %	3.2 %
fibre	1.2 %	2.2 %
mention + cistin	2.0 %	0.8 %
lisin	12.57 %	1.36 %

The feed conversion rate was 1:3.6 kg of feed. The fish was harvested at the end of August. During a production period of 131 days the result/ha was the following:

Common carp	2190 pcs	1500 gr/pc	3287.5 kg	2725.0 kg net yield
Catfish	1737 pcs	2040 gr/pc	3547.5 kg	2497.5 kg net yield
Chinese carp	50 pcs	1500 gr/pc	75.0 kg	62.5 kg net yield
Silver carp	500 pcs	1005 gr/pc	502.5 kg	460.0 kg net yield

The European catfish was exported and the others were sold on the local market.

### ECONOMICAL EVALUATION OF EUROPEAN CATFISH PRODUCTION

The catfish production both in small pond and thermal water basins is a profitable enterprise in Hungary. The farmer's net income per production unit is favourable.



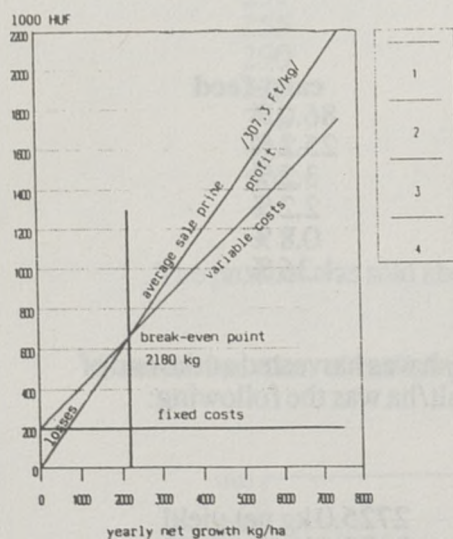
### The results of economical investigation can be summarised as follows:

In the thermal water basins the catfish fingerlins (14 g/pc) have been increased up to a market sizes fish (above 1000 g/pc) during a rearing period of 440 days where the feed conversion rate was 1:2.3 kg of feed.

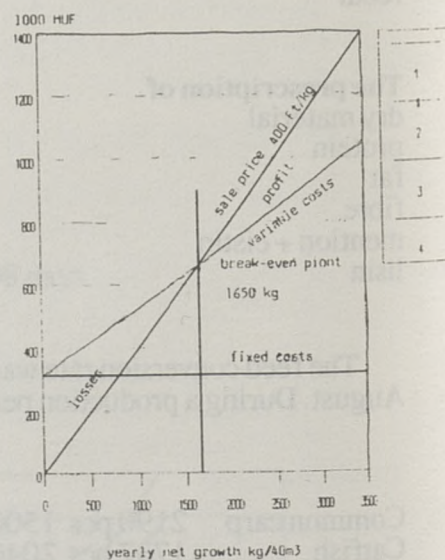
In small size of fish pond (1.8 deep) the net fish production was 5745 kg/ha and the feed conversion rate was 1:3.6 kg of feed. With the combination of the above mentioned two systems - where winter time the fish is reared in the warm water basins we can obtain market size catfish (1200-1500 g/pc) within a period of 18 months. The European catfish can be profitable where the production capacity is fully utilized or in other hand the yearly production is above 1.8 kg fish/m<sup>3</sup> water in fish pond and 41.25 kg fish/m<sup>3</sup> water in the thermal water basins.

### The break-even point of European catfish production is the following:

BREAK-EVEN POINT OF EUROPEAN CATFISH  
IN SMALL FISH POND (1 ha)



BREAK-EVEN POINT OF EUROPEAN  
CATFISH PRODUCTION IN THERMAL  
WATER BASIN (40 m<sup>3</sup>)



Evaluating the above figures can be seen that in small fishpond production the fixed cost is: 30 %, the variable cost is 70 %, but in thermal water basins the fix cost is 48 % and the variable cost is 52 % where the production is at the level of break-even point. In thermal water basin systems the fix cost is rather high therefore it is recommended to run the farm where the market exists and a the available capacity is fully utilized , whereas in small fish pond production the fix cost is much more less, and less the risk too therefore the family farm can be more fitted to the market demand.

Of course besides the high fix cost of thermal water fish production this can be also profitable. The land requirement of one basin with the capacity of 40 m<sup>3</sup> is only 200 m<sup>2</sup> so the production and the profit per unit of land is high.



The European catfish production provide enough net income for a family size farm. Today it is recommended to get 2 MHUF of gross income per year per farmer where the volume of production is as follows:

Denomination	Small fishpond	Thermalwater system
Size of farm	1.1 ha	70 m <sup>3</sup>
Yearly net fish yield	6320 kg	4500 kg
Yearly gross income	1.942.000 HUF	1.976.000 HUF
Material cost	1.314.000 HUF	973.000 HUF
Depretiation	40.000 HUF	375.000 HUF
Other expenses	126.000 HUF	52.000 HUF
Net income before tax	462.000 HUF	576.000 HUF
Tax	23.000 HUF	24.000 HUF
Family net income	439.000 HUF	552.000 HUF

Out of the production cost the percentage of depretiation is: 2.7 % at small fish pond and 26.8 % at thermal water system.

In comparison of the two systems it can be stated that with the same gross income the family can earn 25 % more with thermal water system but the capital requirement of this system is much more higher, therefore it is good where the thermal water is available. The total investment of a basin of 70 m<sup>3</sup> is:

- fixed capital	6.0 MHUF
- working capital	0.5 MHUF
<b>Total</b>	<b>5.5 MHUF</b>

The establishment of 1.1 ha of earth pond costs:

- fixed capital	1.1 MHUF
- working capital	0.7 MHUF
<b>Total</b>	<b>1.8 MHUF</b>

The return on investment (ROI) is:

- at thermal water system	0.10
- at earth pond	0.24

Calculating a combined production system, where 0.,55 ha of fish pond and 35 m<sup>3</sup> of thermal water basins are used for European catfish production the result is the following:

- fixed capital	3.05 MHUF
- working capital	0.60 MHUF
<b>Total</b>	<b>3.65 MHUF</b>



Yearly net fish yield	5.410 kg
Yearly gross income	1.959.000 HUF
Material costs	1.143.500 HUF
Depretiation	207.500 HUF
Other expenses	89.000 HUF
Net income before tax	519.000 HUF
Tax	23.500 HUF
Family net income	495.500 HUF

This combination has an advantage because the cash-flow is better and more smooth then in a traditional fish pond where according to the scheduled production program the farmer can earn money from the fish-pond production in summer time and from the thermal water basin production in winter time.