TILAPIA FARMING IN HUNGARY WITH THE USE OF GEOTHERMICAL WATER SUPPLY

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SZARVAS - FISH Kft. H-5540 Szarvas I. külterület 57.[2]

ARANYKÁRÁSZ Bt. H-5540 Szarvas Jókai u. 40/B.[3]

Required Features of Modern Fish Products

- Boneless
- White or pink colour
- Firm texture
- Slight flavour and odour
- Standard size
- Continuous quality and supply over the whole year
- Ability to bio-production

Hungary is reach in Thermal Spring Water Sources.

- Geothermical gradient is uniquely high in the lowland (20 m/^{o}C).
- 1300 springs in operation ensuring warm water of 35-93^{o}C.
- Most of them are suitable for aquaculture activities

Water Characteristics at the Site

Water temperature	23-25 °C
pH	7,7-8,0
Conductivity	816 µs/m
HCO_3	545 mg/l
COD	8,2
NO_3	1,5 mg/l
NH_4	0,3 mg/l

The required dissolved oxigen content (95% saturation) is ensured by aeration systems. (paddle wheels, propeller tipe aerators)

TUKA Fish Farm

Spawning Tanks

Results of Spawnings

	Spawning tank 1	Spawning tank 2	Spawning tank 3
Date of stocking	1-2nd Aug 2001	21-22nd Aug 2001	29th July 2001
Number of breeders	110	110	650
Sex ratio ♀:♂	1:1	4:1	1:1
Date of harvesting	8-10th Sept	8-10th Sept	11th Sept
Harvested fingerlings pcs	36 000	38 000	85 000
Harvested f. sizes	1,0-6,0 cm	2,0-2,5 cm	3,0-12,0 cm

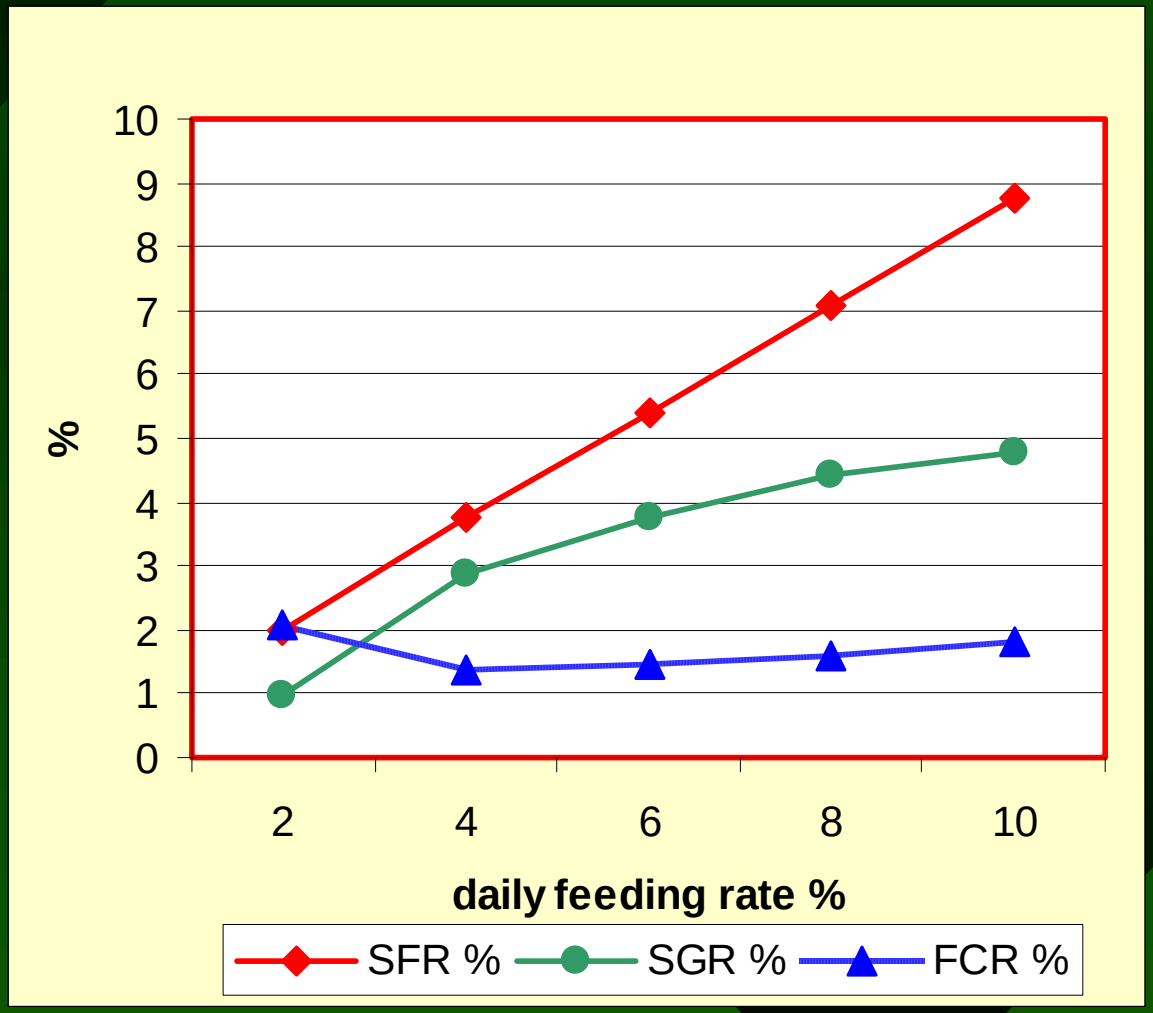
Targets of Feeding Investigations

- Determination of feeding rate using a given food formula
- Testing the influence of feeding frequency
- Optimalization of crude protein content during the raising of tilapia fingerlings

Stocking Material

Chitralada parent stock of Nile tilapia
(Oreochromis niloticus L.)

Variation of FCR at Different Daily Feeding Rates



Results of Different Feeding Rates

Optimal food dose: SFR_{opt} **4,98%/day**

Growth at opt.food dose: SGR_{opt} **3,21%/day**

FCR at opt. food dose: FCR_{opt} **1,55 kg/kg**

Feeding Frequency, FCR and SGR

Tank No. Number	Feeding freq. Feedings/day	FCR (kg/kg)	SGR (%)
1	1	0,96	3,89
2	3	0,71	5,17
3	5	0,71	5,07
4	7	0,74	5,01
5	1	0,86	4,21
6	3	0,75	4,84
7	5	0,71	4,97
8	7	0,69	5,15

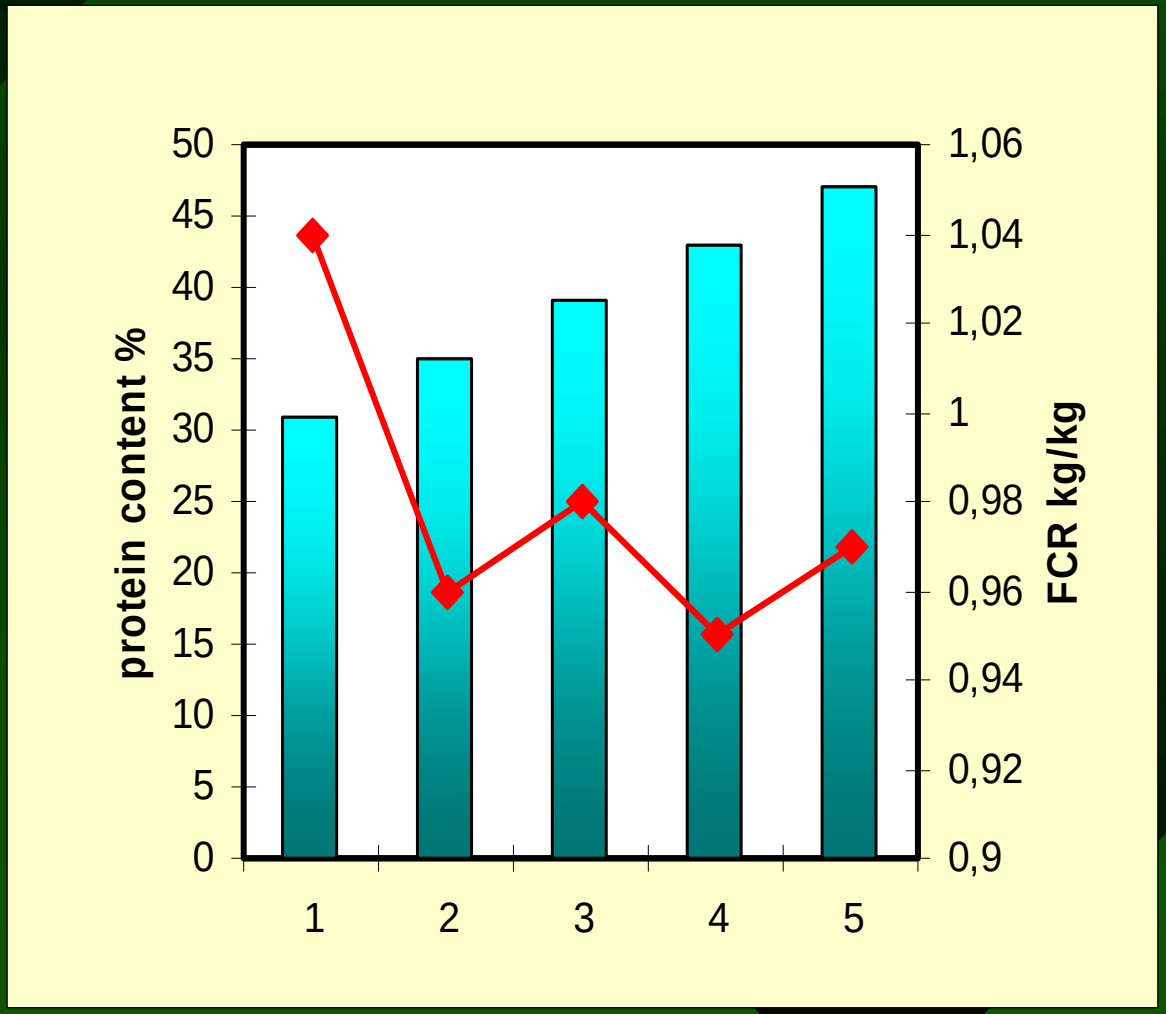
Conclusions of Testing Feeding Frequency

- Feeding is is more efficient in small doses
- Frequent feeding with smaller doses results balanced water quality
- Proportioner feeders filled twice a day ensure the distribution of food in small doses

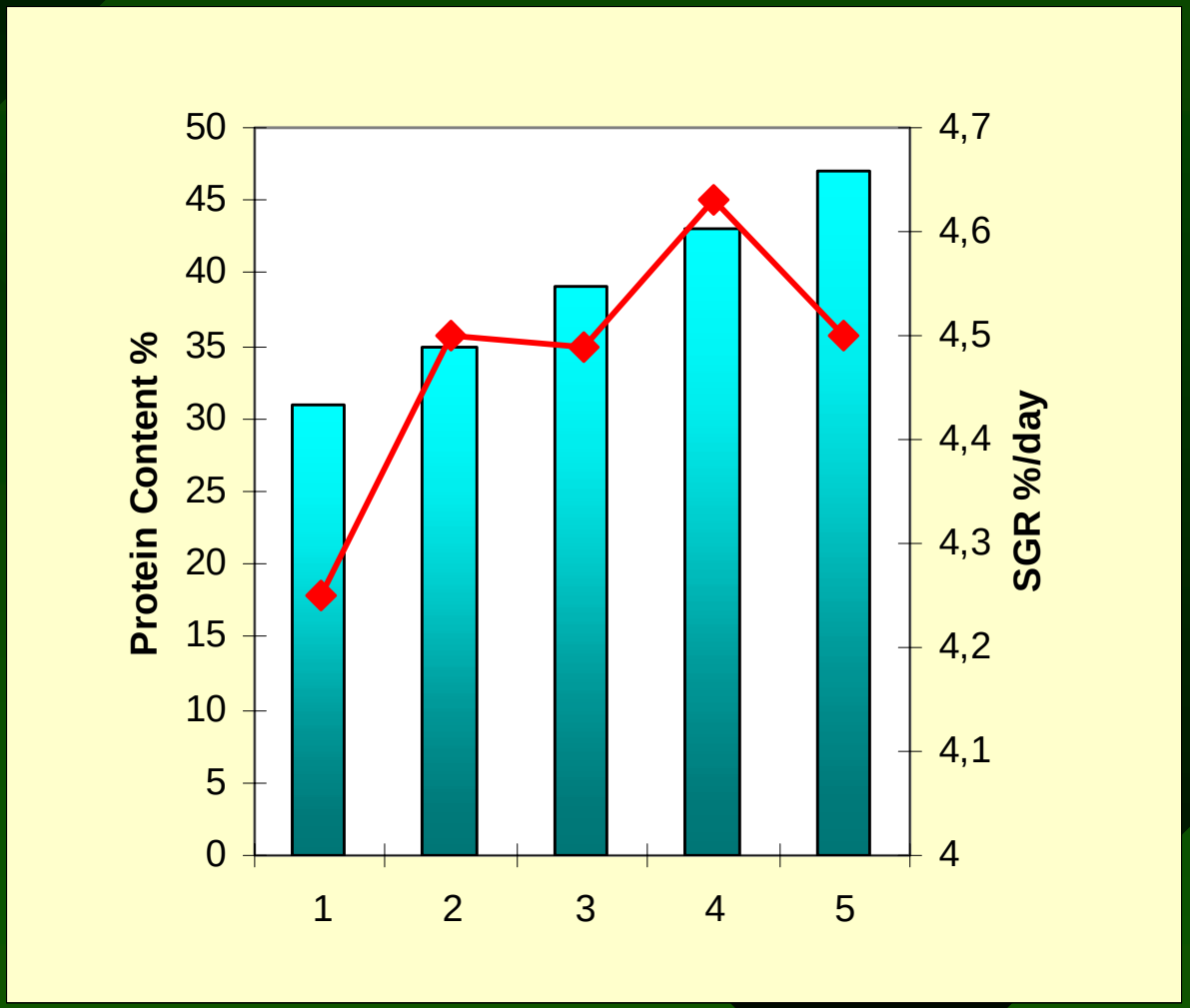
Variation of FCR and SGR at Different Protein Levels in Diet

Crude protein %	FCR kg/kg	SGR %
31	1,04	4,25
35	0,96	4,50
39	0,98	4,49
43	0,95	4,63
47	0,97	4,50

Coherence of Crude protein Content of Food and FCR



Coherence of Crude Protein Content of Food and SGR



Various Diet Formulas

Components (%)	Diet formulas				
	1. 31%	2. 35%	3. 39%	4. 43%	5. 47%
Fish meal	6	8	15	24	30
Meat meal	22	28	30	28	30
Blood	5	5	5	5	5
Extruded soybean	10	10	10	10	10
Wheat	53	45	36	29	21
Vegetable oil	2	2	2	2	2
Minerals	1	1	1	1	1
Vitamins	1	1	1	1	1
Total (%)	100	100	100	100	100
Crude protein (%)	30,81	34,65	39,16	42,81	46,81

Optimal and Economic Protein Content

- The best growth rate was observed in the case of feeding pelleted diet containing 43% of crude protein
- The specific price of lower protein content diets compensates the unfavourable values of feeding indicators.
- Rearing food formula contains 29% of crude protein

Results of Tank Rearing

Rearing period days	Stocking g/fish	Harvesting g/fish	Surv. rate %	FCR kg/kg
208	41	327	97,20	1,57
122	58	181	97,17	1,80
122	164	384	99,41	1,69

Aeration Tank

Water Mixer Tank

Aeration In Tilapia Rearing Tank

Rearing Tanks in Dark

Waiting for Food

Market Size Tilapia

Processing Unit

Gutting Line

Cleaning Table

Ice Flake Maker

Cold Store

Market Size Tilapia during processing

Cleaned and Gutted Tilapia Before Packing

Fresh Tilapia Fillets in MAP

THANK YOU FOR THE KIND ATTENTION !