



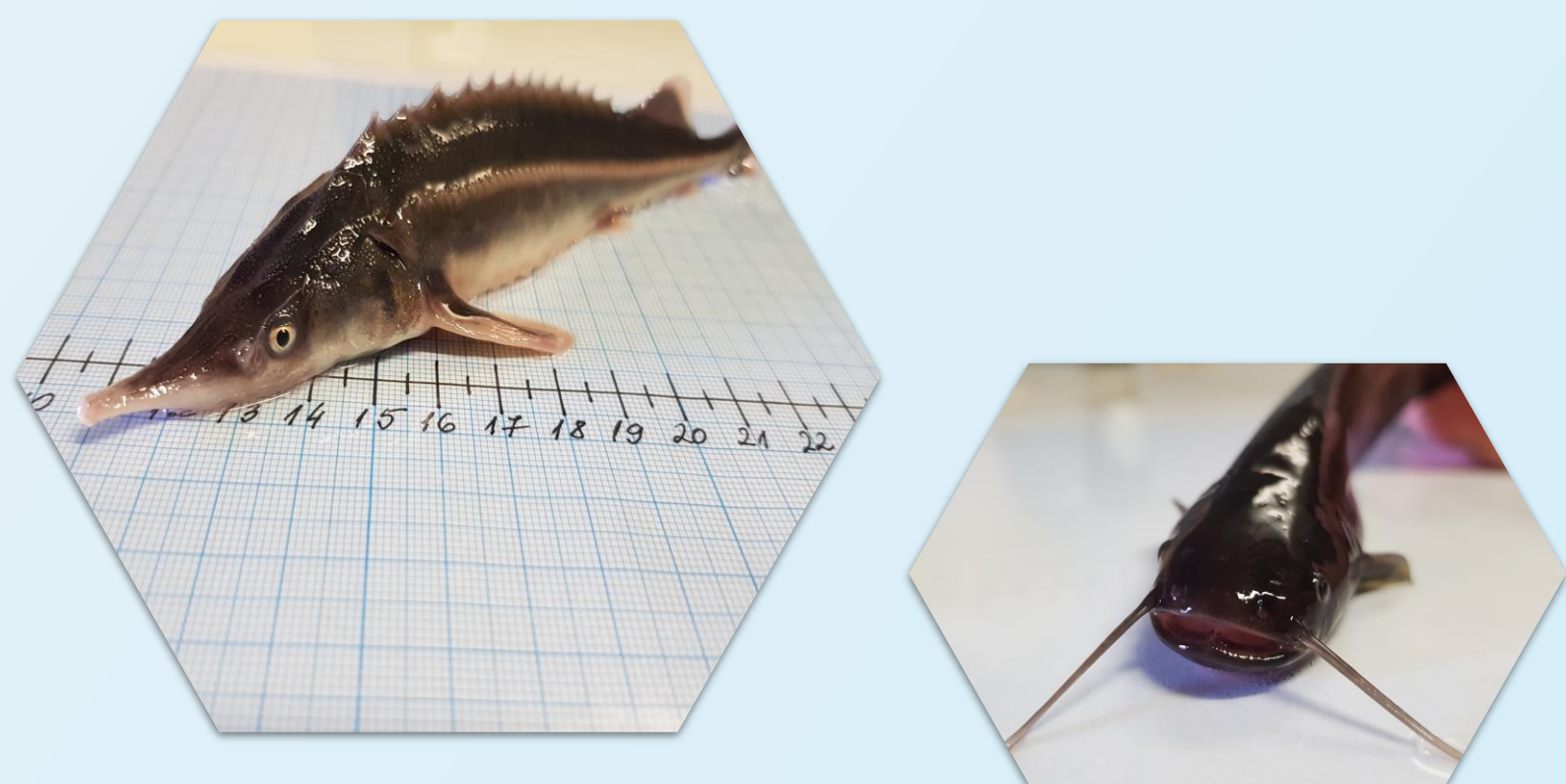
Study on the Effects of Polyculture of the Sterlet (*Acipenser ruthenus*) Fingerlings and European Catfish (*Silurus glanis*) on Bioproductive Performances of these Species in Recirculating Aquaculture Systems

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• AIM

The aim of this study was to evaluate the effects of polyculture of the sterlet (*Acipenser ruthenus*) fingerlings with european catfish (*Silurus glanis*) (20 – 30%) into recirculating aquaculture system on growth dynamic of the fish and tank's bioproductivity.

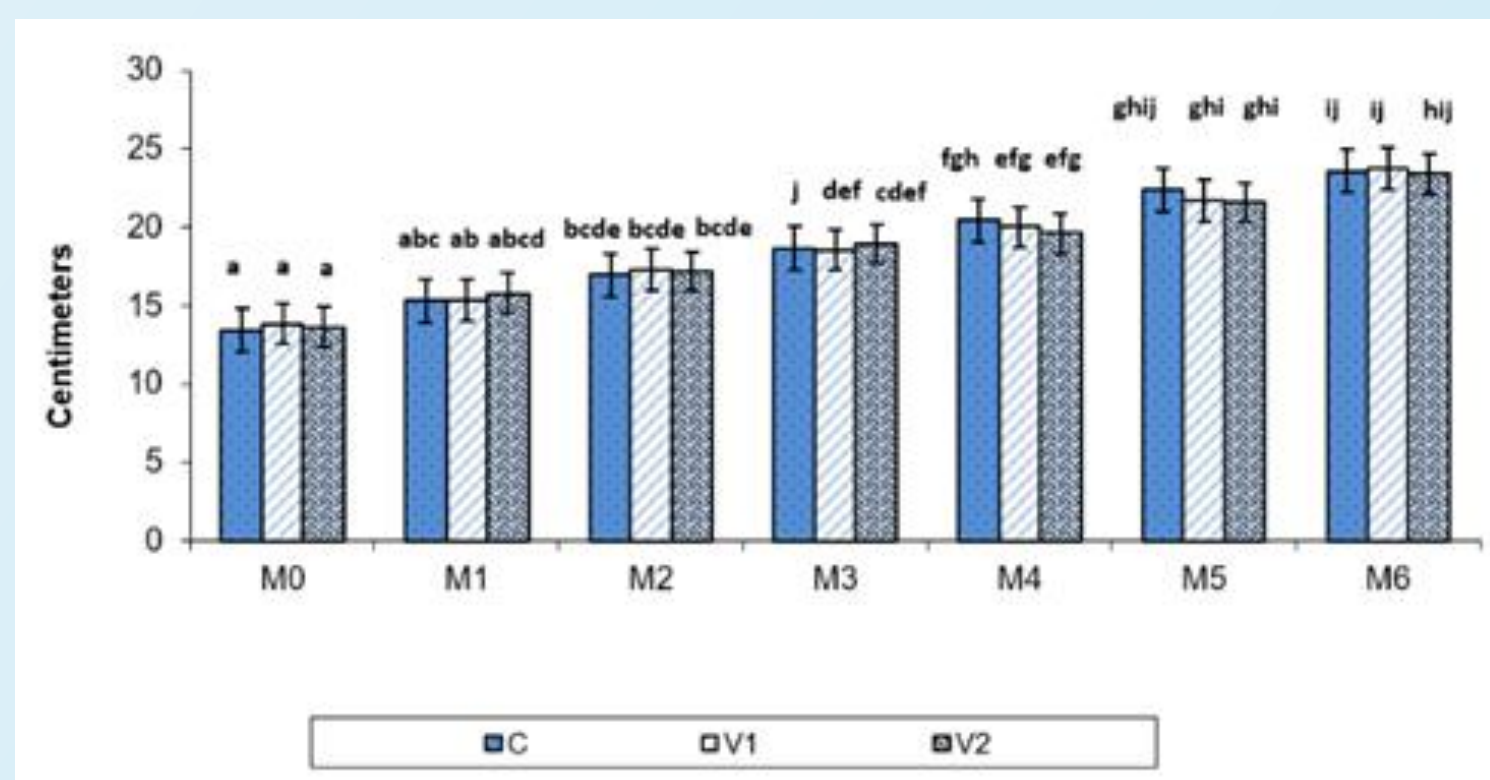


• Materials and methods

- In our study we used 114-days-old sterlet and 47-day-old european catfish ;
- Both species were obtained by means of artificial reproduction in recirculating aquaculture systems, in the spring of 2019. ;
- The RAS used for the fish rearing had 16 tanks, with a total capacity of 12 m³;
- Two variants of polyculture and one variant of monoculture, were tested in duplicate over a period of 42 days as follows:
 - Control (M): sterlet grown in monoculture (600 sterlet/tank);
 - Variant 1 (V1): sterlet (600 sterlet/tank) plus 20% european catfish (120 european catfish/tank); The european catfish total weight in this trial represents 7.23% of total sterlet biomass
 - Variant 2 (V2): sterlet (600 sterlet/tank) plus 30% european catfish (180 european /tank); The european catfish total weight in this trial represents 10.63% of the total biomass of the sterlet
- The fish were fed with dry food. The food quantity was calculated as 4% of the sterlet biomass in the first 2 weeks, then increasing to 5%. Feeding was done manually every 4 hours.
- The main measurements were carried out (total length – TL; standard lengths – SL, maximum body depth – MBD and body weight – BW) were measured weekly, each time being made on measured for 180 sterlets from 6 tanks (30 sterlets / tank) and 120 european catfish from 4 tanks (30 european catfish / tank)
- Based on the data obtained after the measurements, the main bio-productive indices like weight gain (WG), specific growth rate (SGR), daily growth rate (DGR) and feed conversion ratio (FCR) were calculated;
- The data were analyzed using STATISTICA10 software. Kruskal-Wallis test was used to assess the significance of differences.

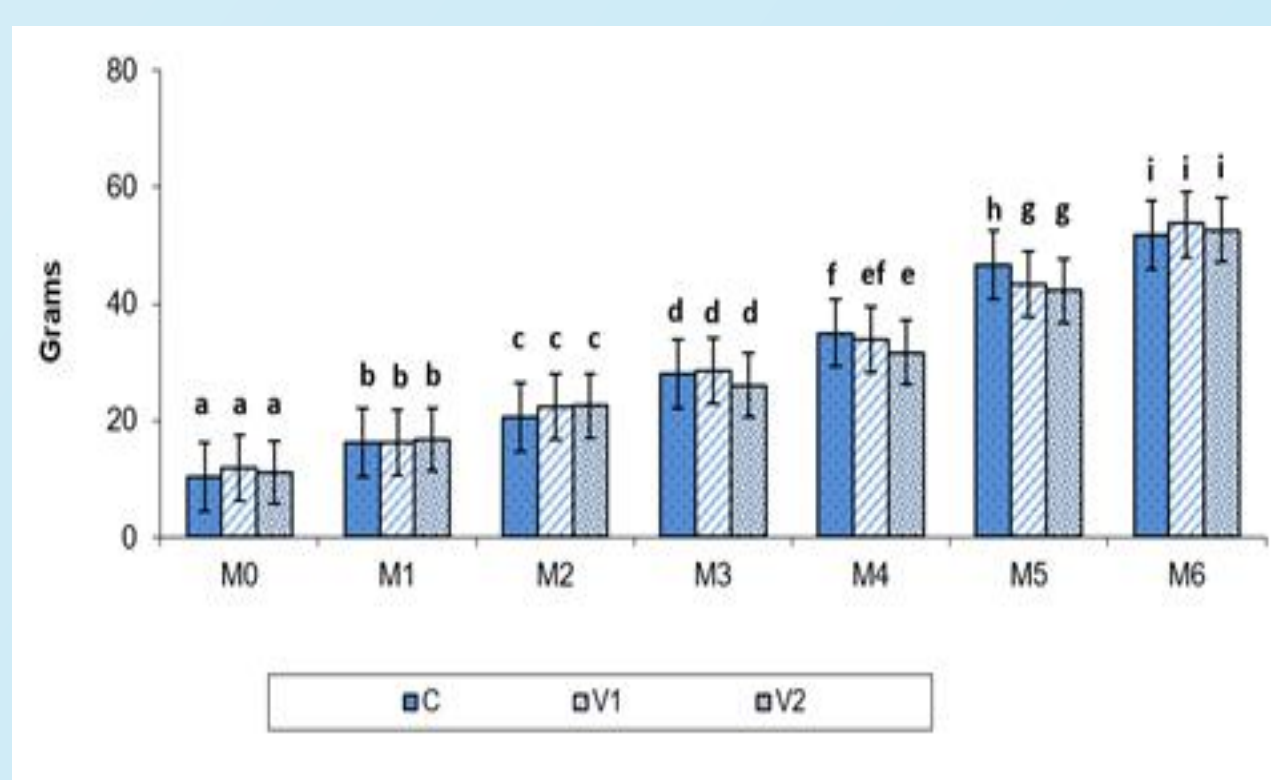
• Results and discussions

The weekly dynamic of the total length and the significance of the differences in sterlet.

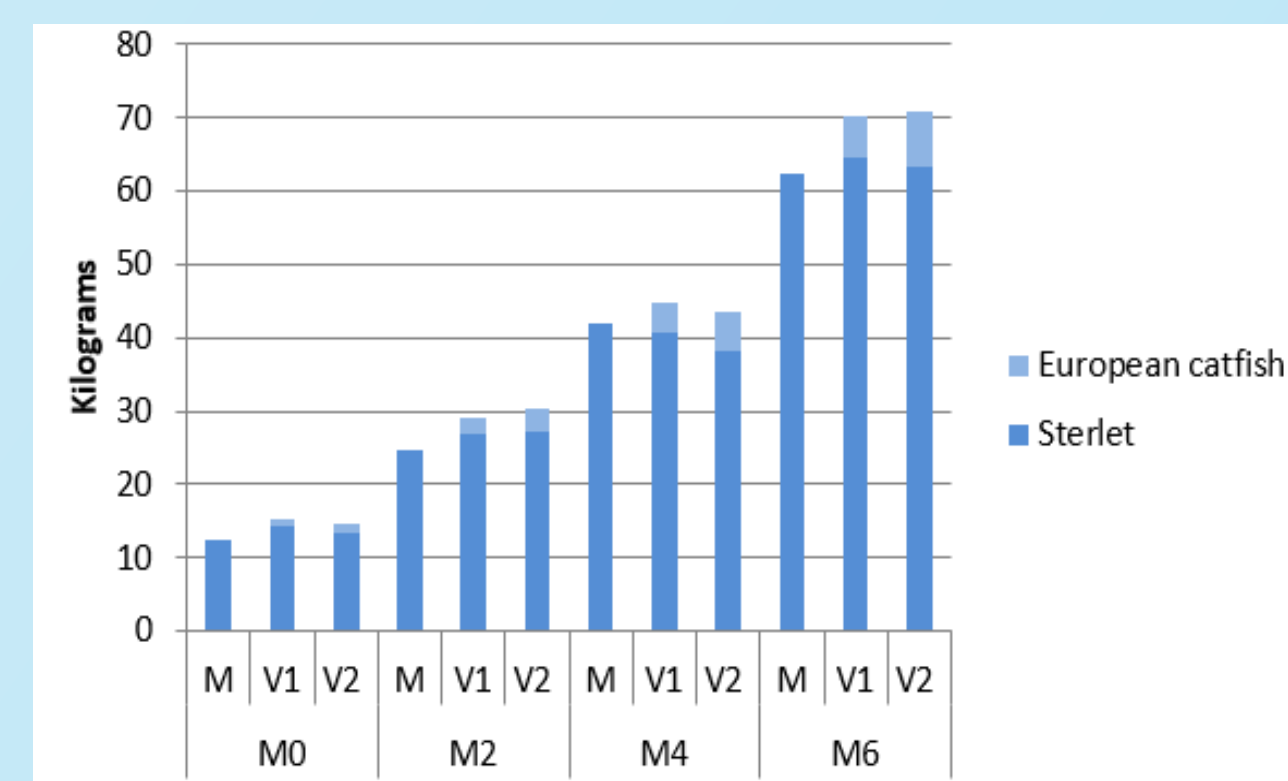


M0 – M6 – weekly measurements. Same letter indicates not significant differences (p>0.05)

The weekly dynamic of the body weight and the significance of the differences in sterlet



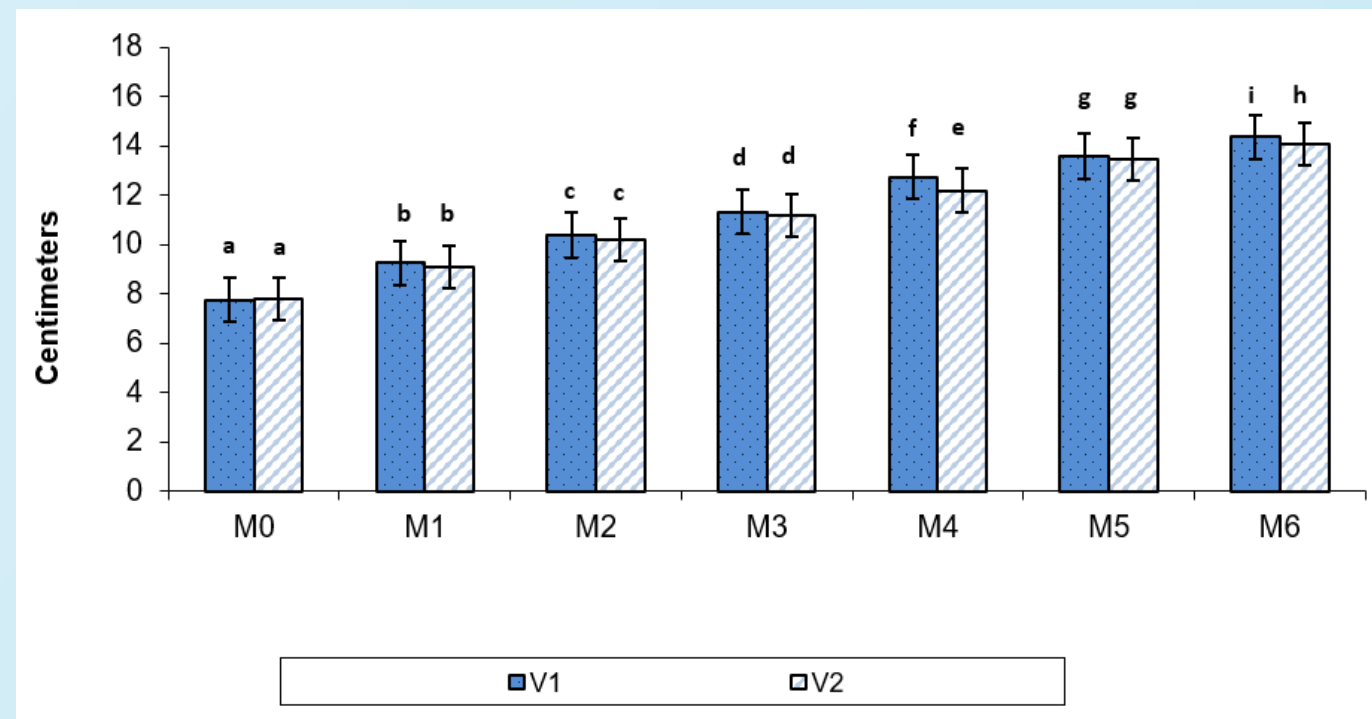
Graphical representation of biomass / m³ on experimental variants



The highest increase in biomass was recorded in the sterlet polyculture variant with 30% european catfish (70.97 kg), followed by an extremely small difference in biomass growth in polyculture with 20% catfish (70.03 kg).

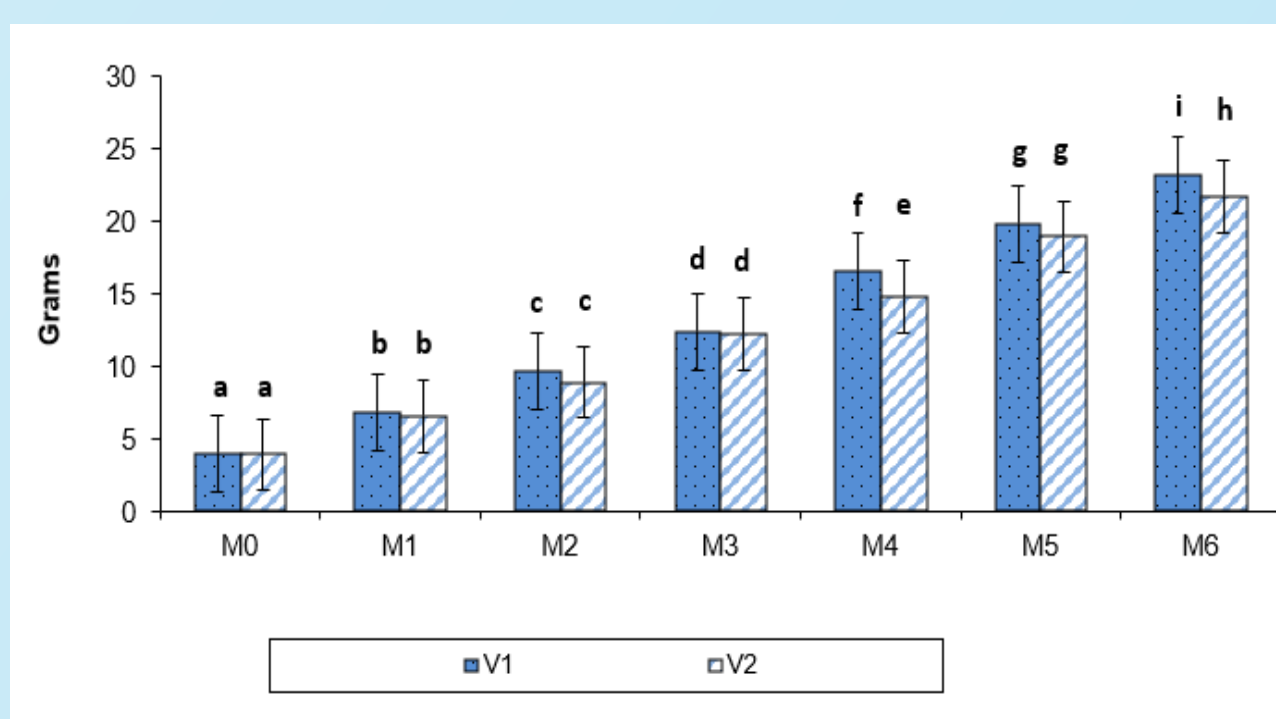
The total length and body mass of the studied sterlet fingerlings had a significant increase but the differences between the three experimental variants were very small (p>0.05). The total length of the sterlet fingerlings registered the highest value in V1 (23.74 ± 1.93 cm), and the smallest value in control group C (23.40 ± 1.58 cm). The sterlets in the experimental variant V1 (53.73 g ± 13.59 g) were with 1.83 g heavier than those in group C (51.90 ± 11.48 g) and with 1.1 g heavier compared to the fingerlings from the experimental variant V2 (52.63 ± 11.10 g)

The weekly dynamic of the total length and the significance of the differences in european catfish

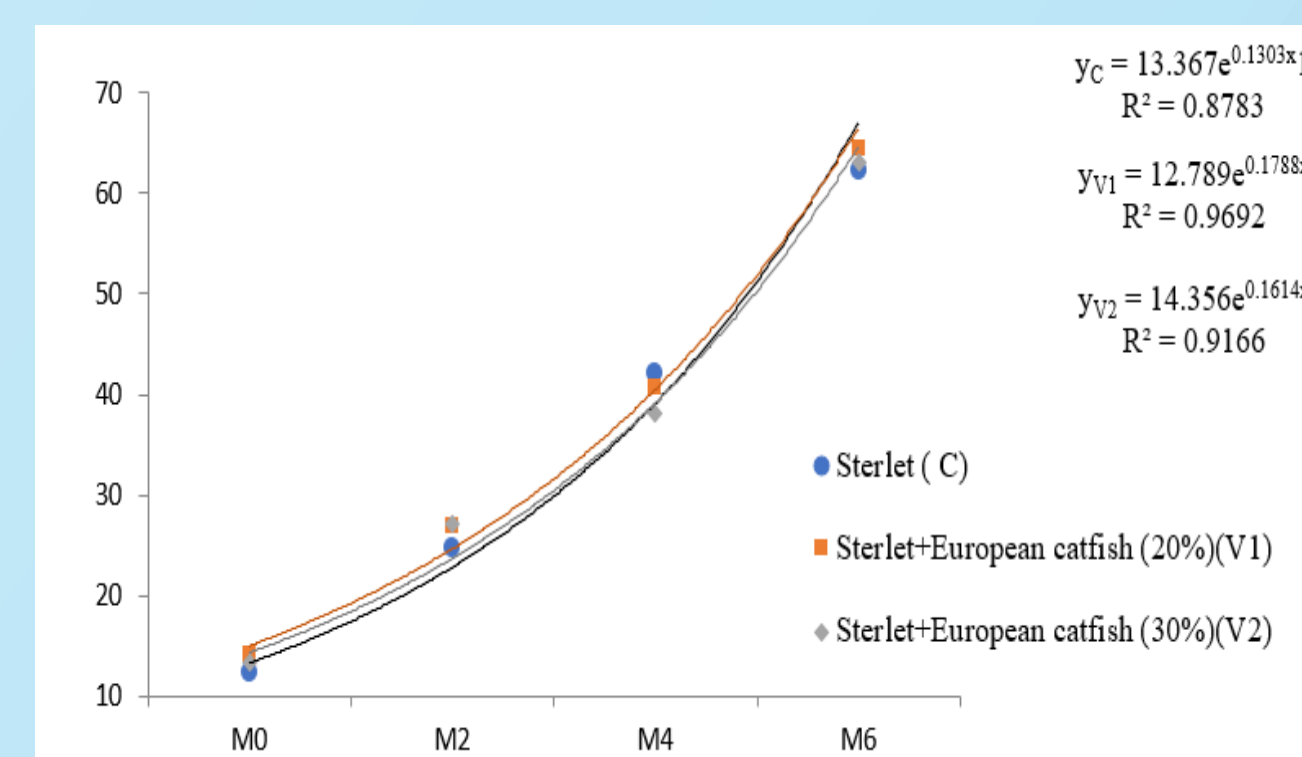


M0 – M6 – weekly measurements. Same letter indicates not significant differences (p>0.05)

The weekly dynamic of the body weight and the significance of the differences in european catfish



The juvenile european catfish from the experimental variant V1, had a significant increase in body mass (p<0.001), increasing from 3.984 ± 0.45 g to 23.15 ± 5.30 g in 42 days. These values indicate that the body mass of the european catfish has increased almost 6 times in a relatively short period of time. It also had a very significant growth in total length (p<0.001), increasing from 7.74 ± 0.33 cm to 14.35 ± 1.10 cm in 42 days, doubling its length (Table 3)



The best results of the food conversion rate on the polyculture basins were obtained at the end of the experimental period in variant V2 (1.044).

Specification	Control	V1	V2
SGR _{BW} (% day ⁻¹)	3.855	3.603	3.709
SGR _{TL} (% day ⁻¹)	1.339	1.284	1.285
DGR (g)	0.991	0.997	0.989
FCR (sterlet)	1.177	1.169	1.179
FCR (Sterlet + carp)		1.071	1.044

• Conclusions

- The polyculture of the sterlet fingerlings with european catfish 20% (V1) or 30% (V2) for 42 days did not significantly (p>0.05) influenced the sterlets' growth dynamic.
- A significant plus of fish biomass (european catfish) resulted by valorisation of the pellets unconsumed by the sterlet, was obtained in both polyculture variants (V1, V2).
- European catfish appear to be an additional good species for sterlet polyculture in recirculating aquaculture systems.

• Acknowledgements

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