Effect of different diets containing rotifers and copepods as first feeding on *Sander lucioperca* (Linnaeus, 1758) larvae

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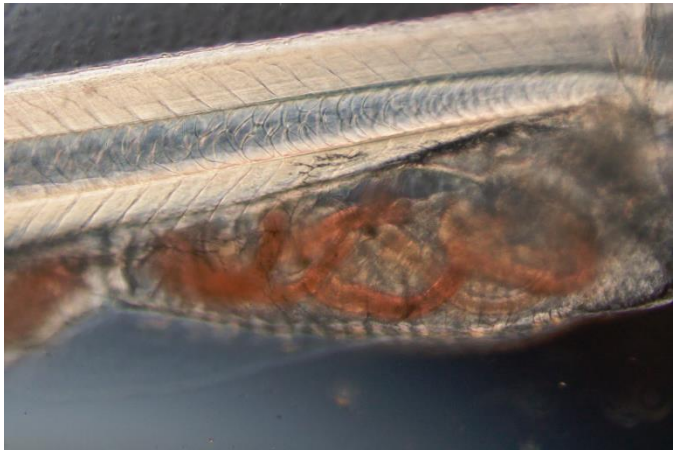
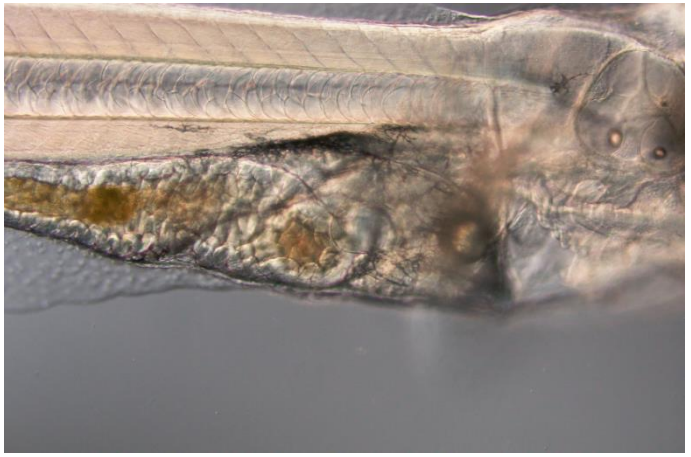
- The interest in sustainable production of *Sander lucioperca* has grown in recent years (FAO 2020)

- The costs of pikeperch production are still high due to the lack of stable production volume (Policar et al. 2019)

- Potential areas for improvement are the broodstock management, the controlled reproduction and **the larval culture**

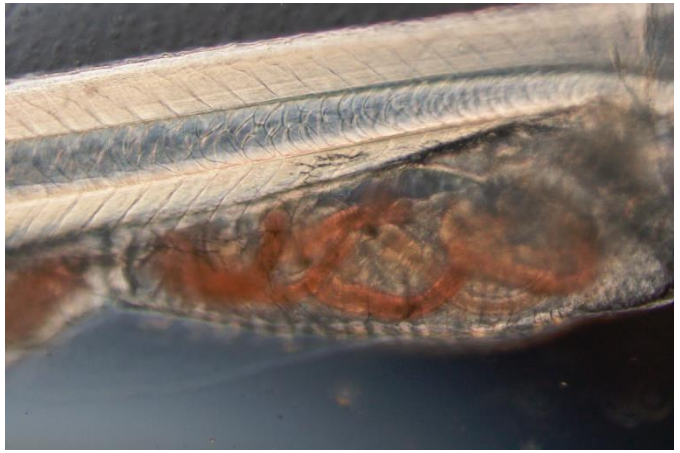
- More effort should be done to find the **nutritional requirements** of pikeperch larvae

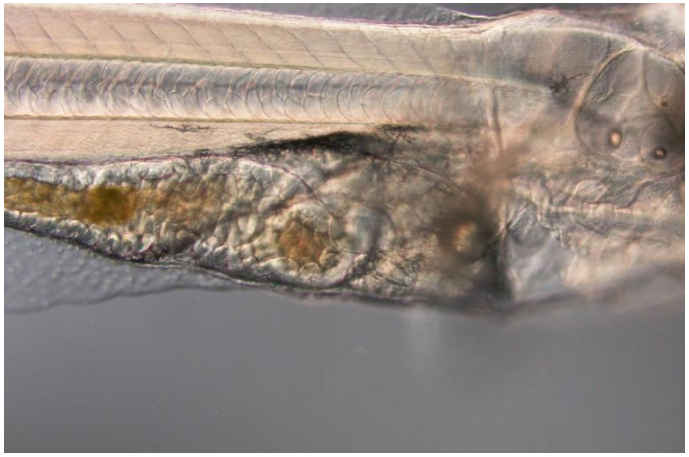




Diets for pikeperch larvae:

- *Artemia* sp. (Bischoff et al. 2018, Yanes-Roca et al. 2018)
- *Brachionus plicatilis* (Imentai et al. 2019a, Imentai et al. 2019b, Imentai et al. 2020, Yanes-Roca et al. 2018, Yanes-Roca et al. 2020)
- *Brachionus calyciflorus* (Kubitz et al. in preparation)
- *Brachionus diversicornis* and *Brachionus quadridentatus* (Xu et al. 2017)

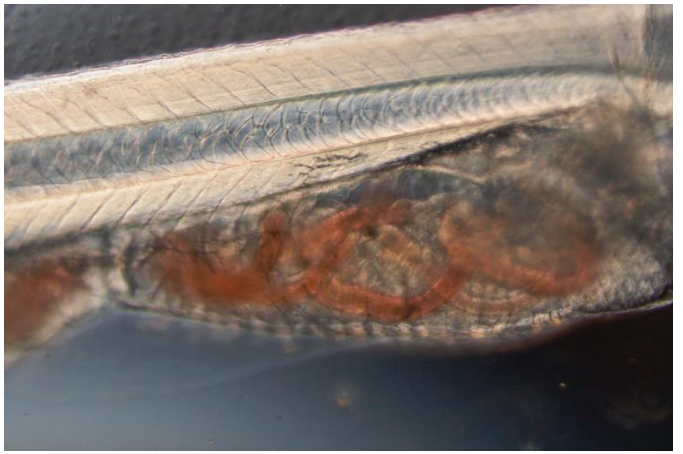


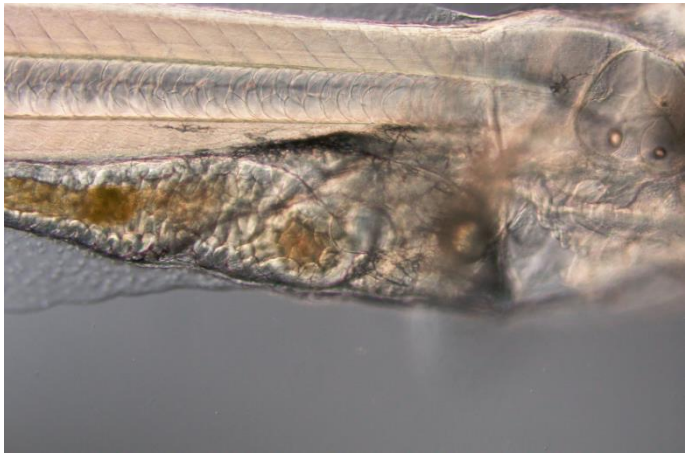


- The use of *Artemia* sp. seems to be questionable (Bischoff et al. 2018)

- Although rotifers can be used during the first days of feeding, their size will become the limiting factor

- Copepods are gaining attention for larval rearing due to their size ranges, swimming behavior and nutrient content





- Our aim was to investigate the effect of different diets with the rotifer *Brachionus plicatilis* and the copepods *Apocyclops panamensis* on the survival and growth rates of pikeperch larvae during the first 10 days of life

- We performed two independent experiments in 2020. Two diets were investigated during the first experiment and six diets in the second experiment (Table in next slide)

Diet	Experiment	Composition	Zooplankton specimens per fish per day	Zooplankton specimens per ml
B100-200	1	*B. plicatilis* 100%	200	6.98
B50+A50-200	1	*B. plicatilis* 50% *A. panamensis* 50%	200	6.98
B100-400	2	*B. plicatilis* 100%	400	18.95
B100-600	2	*B. plicatilis* 100%	600	28.42
B85+A15-400	2	*B. plicatilis* 85% *A. panamensis* 15%	400	18.95
B85+A15-600	2	*B. plicatilis* 85% *A. panamensis* 15%	600	28.42
B70+A30-400	2	*B. plicatilis* 70% *A. panamensis* 30%	400	18.95
B70+A30-600	2	*B. plicatilis* 70% *A. panamensis* 30%	600	28.42

- *B. plicatilis* was cultured using *Nannochloropsis* sp. and *A. panamensis* using *Isochysis galbana*

- Larvae were fed with the diets from dph 4 until dph 10, a total of 7 days

- Survival was calculated counting the dead larvae every day by siphoning the bottom of the tanks and was considered only during the feeding period of 7 days

- The total length of the larvae was measured at the beginning and at the end of the experiment and it was used to calculate the specific growth rate (SGR)

- ***Survival*** *(%) = [(Ni-TD)*100] / Ni*

where Ni is the initial number of larvae and TD the total dead larvae found

- ***SGR*** *(%*d^{-1})= (ln(Lt/Lo)*t^{-1})*100*

where Lt and Lo the average length of the larvae at time t and time t = 0 represents

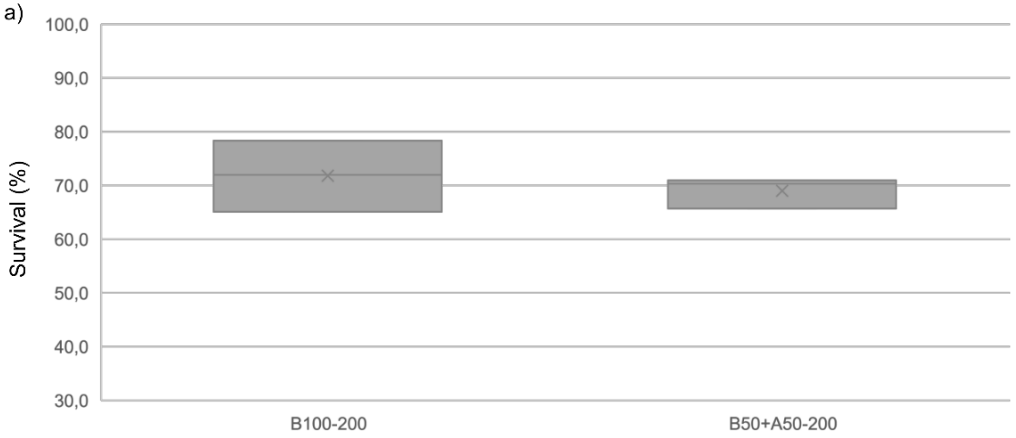
- **Statistics in SPSS**

ANOVA (When normal distribution)

Kruskal-Wallis test (When no normal distribution)

Survival

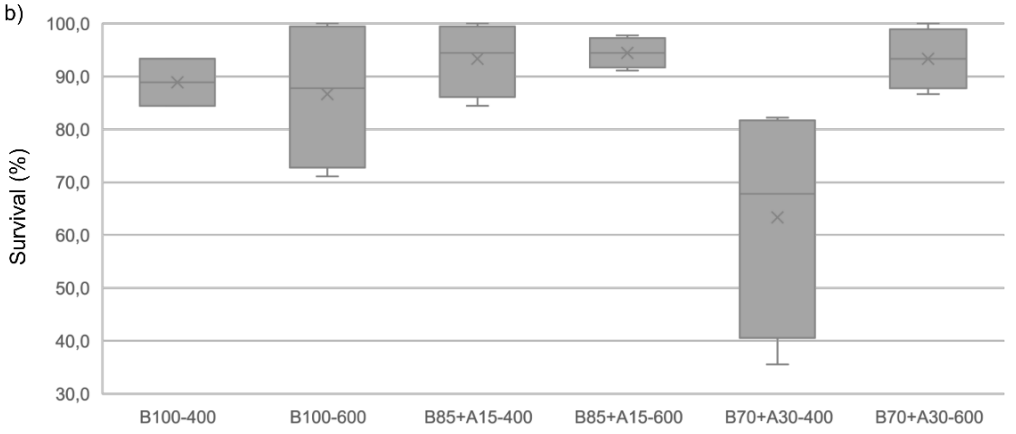
First experiment



Kruskal-Wallis
p=0.827

No significant differences

Second experiment

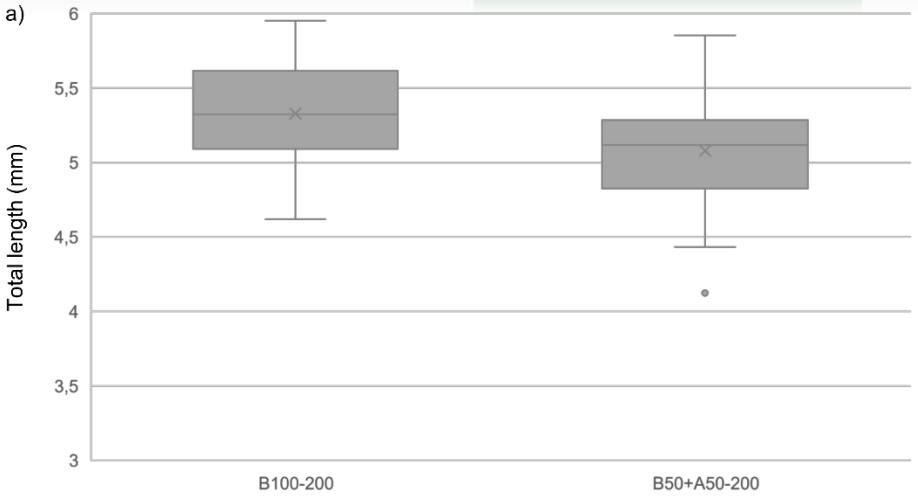


Kruskal-Wallis
p=0.097

No significant differences

Total body length

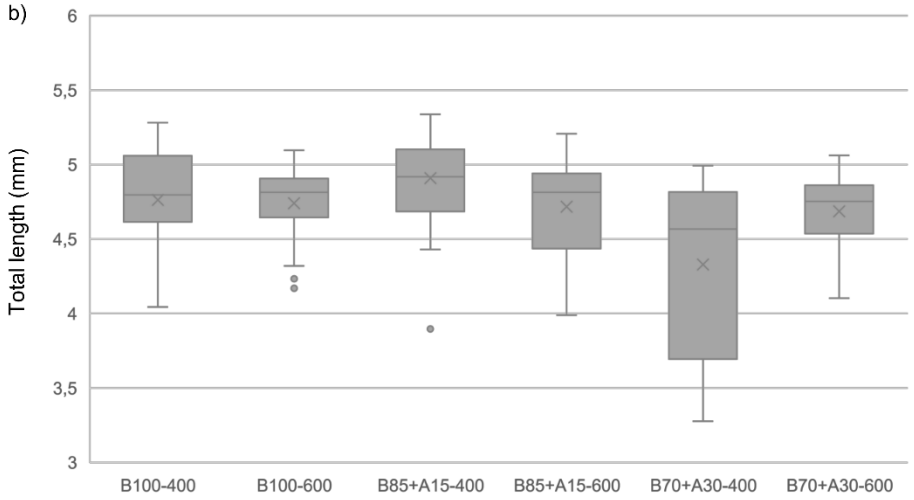
First experiment



ANOVA p=0.003

Significant differences

Second experiment

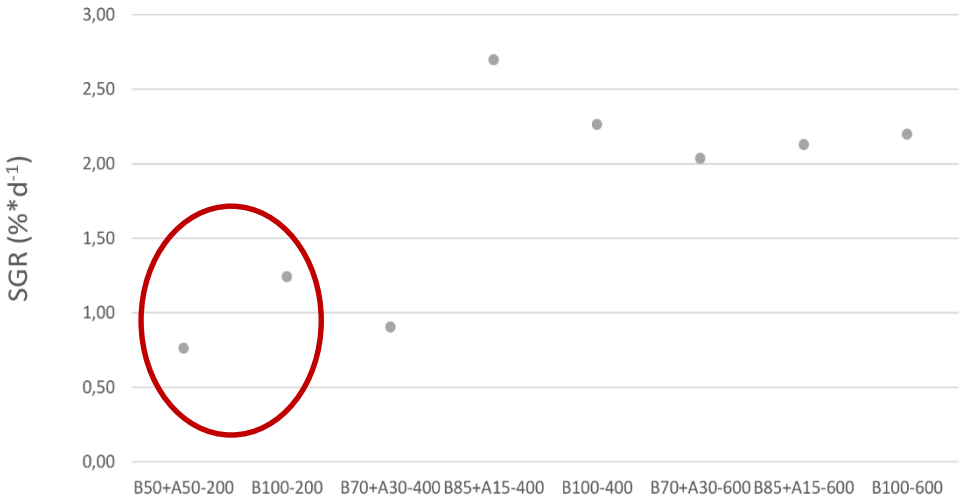


Kruskal-Wallis p=0.003

Significant differences mainly due to diet B70+A30-400 (pairwise comparison)

SGR

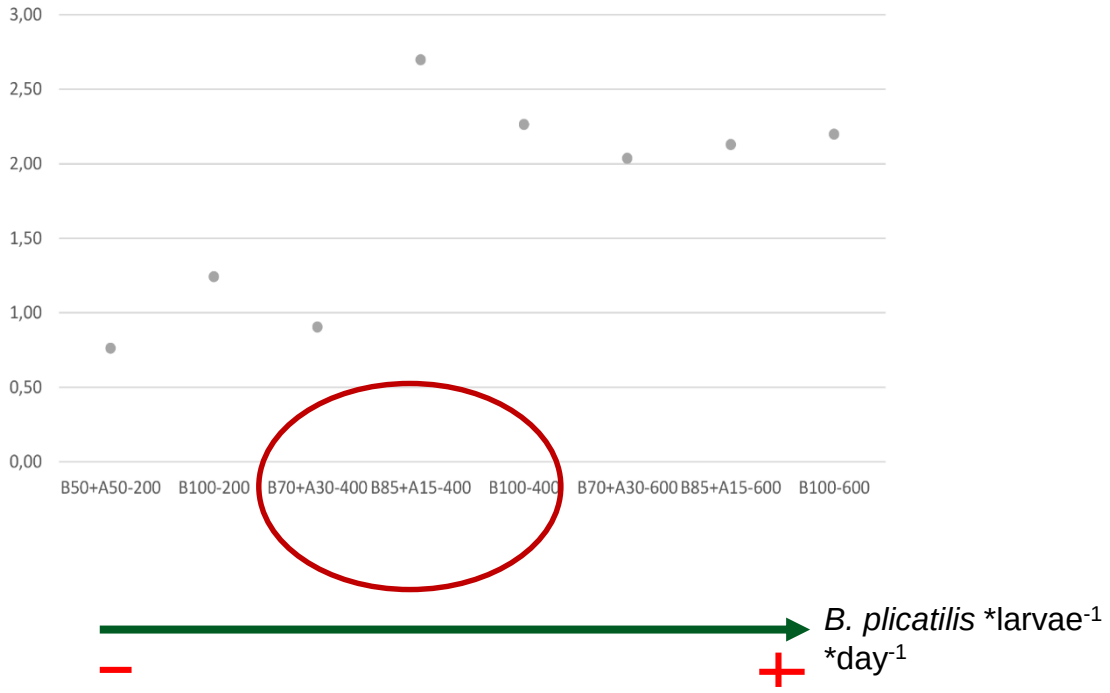
During the **first experiment**, the highest SGR was obtained by those larvae fed only *B. plicatilis* (in red circle)



SGR

In the **second experiment**, if we compare the diets with **400** specimens of zooplankton per fish per day (in red), the highest SGR was obtained by those larvae fed 340 *B. plicatilis*larvae^{-1}*day^{-1}*

From this amount of food, the SGR seems to have an improvement (next slide)



SGR

In the **second experiment**, when we compare the diets with **600** specimens of zooplankton per fish per day (in red), the highest SGR was obtained by those larvae fed only *B. plicatilis*. We can see here a good SGR but not better than with less amount (as we saw previously)

- *Apocyclops panamensis* showed no clear advantages from dph 3-10

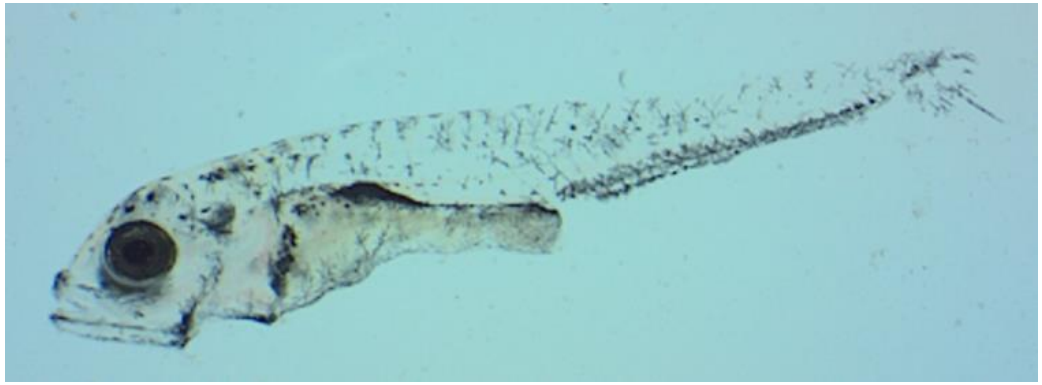
- The reason behind can be the supply of the wrong copepod stage (mix culture). The size of the copepod nauplie could be more adequate (80-200µm)

- Further research should be done also at later larval stages. And a better management of the copepods should be carried out

- There is a point at which the fish larvae cannot ingest more food. Our data can indicate this threshold in *Brachionus plicatilis* quantity

- In relation to this fact, it is essential to take into account the larval stocking density in relation with the food availability. Like this, every larvae get enough food

- With a concentration in the water of 16 *B. plicatilis* per ml
- At a stocking density of 50 larvae per liter
- Our recommenation is: at least 340 *B. plicatilis* a day for each larvae



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Thank you