

FACULTY OF FISHERIES & PROTECTION OF WATERS

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How to stabilize supply of larvae and juveniles in Eurasian perch and pikeperch

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Egg incubation

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Perch egg ribbons - in floating cages in tanks or in special water-flow incubators.



Pikeperch egg – in Zug jars (after egg stripping and artificial fertilization or on artificial nests (after natural spawning))

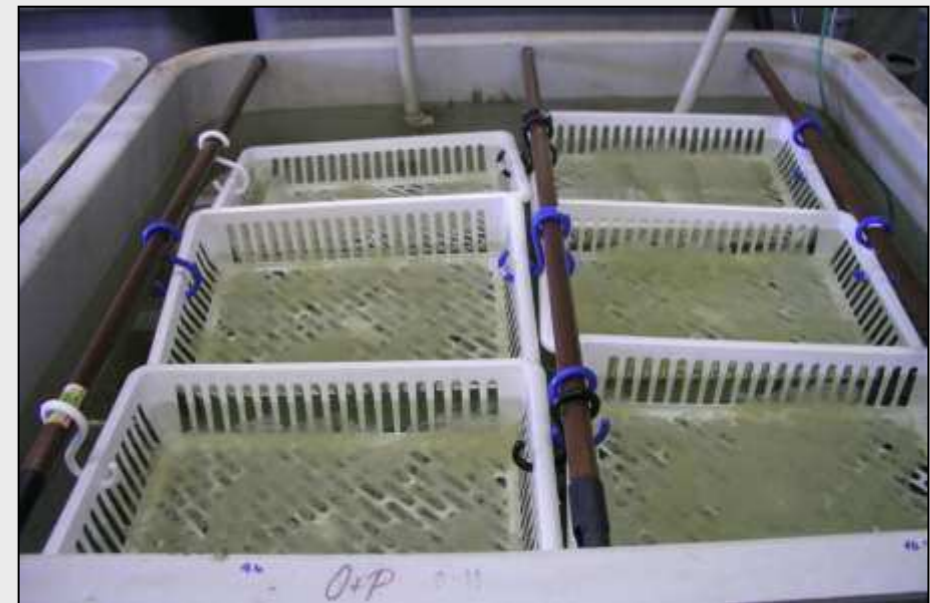
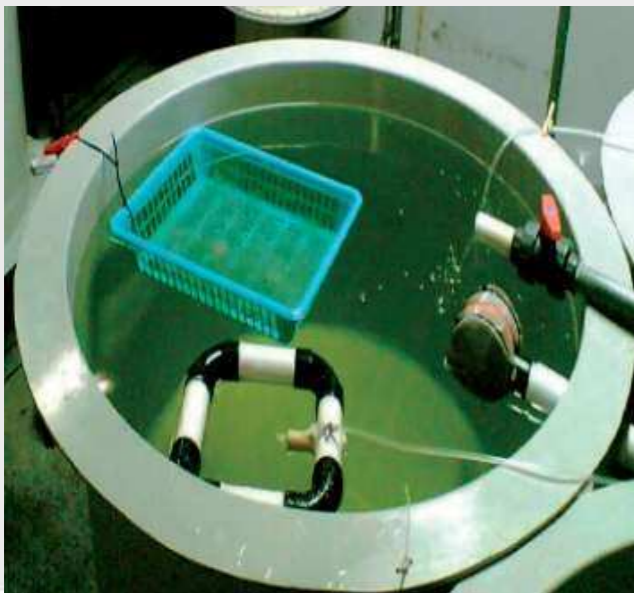


Egg incubation



The maintenance of high water quality and egg disinfection during incubation

- very important for obtaining stable and healthy larval production
- disinfection treatments: salt, akriflavin jodisol and buffodine





Culture system for larval and juvenile production



Controlled tank system in RAS

- very effective system for continual high quality production
- using out-of-season spawning
- higher investment and production cost
- problem with reproduction quality and with larval culture





Combination of mesocosm system with RAS

- mesocosm system for larval and early juvenile stage
- lower investment and production cost for juvenile fish
- less stable juvenile production
- juveniles up to 0.5 – 1 gram are stocked in RAS and adapted on dry food





Combination of pond culture with RAS

- Using of pond cultured broodstock – high quality of gamet,
- Egg incubation under controlled conditions,
- Stocking of larvae into ponds,
- One-month rearing under pond conditions with controlled production of zooplankton,
- Gently harvesting of juveniles in outlet channel,
- Stocking of juveniles in RAS with their adaptation there
- lower production cost for juveniles,
- high quality of juveniles with survival 25% from larval stage to juvenile about 7-10 grams.





**One or multiple terms of
production**

One or multiple terms of production



One production of larvae and juveniles per year using natural spawning - for larval and juvenile pond culture,

We would like to test two-terms production for pond culture (spawning in April and June /harvest in June and August),

Multiple-term production of larvae and juveniles using out-of-season spawning – for larval and juvenile controlled culture within RAS.





Tank design within RAS

Tank design within RAS



- Different tanks of various shapes and materials are used for larval and juvenile culture.
- For larval culture: optimum cylindrical tanks with darker walls and water volume about 1m^3
- For juvenile culture up to 1-10 grams: round tanks with grey walls and with 5-10 m^3 of water volume.





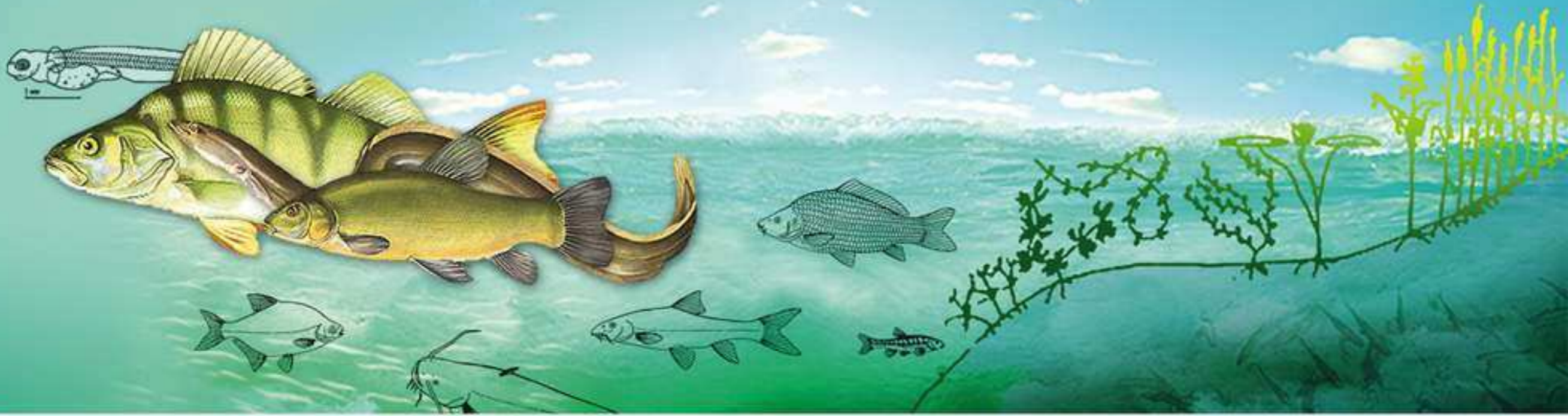
Optimal culture conditions in RAS

Optimal culture conditions in RAS



- Water temperature 22-24°C,
- Oxygen saturation 100%,
- Ammonia concentrations $< 0.2 \text{ mg.l}^{-1}$,
- Nitrite concentrations $< 0.5 \text{ mg.l}^{-1}$,
- Light regime 16L:8D,
- Light intensity 400 – 600 lx for larvae and 300 – 400 lx for juveniles and older fish,
- Fish density:
 - larvae 50 – 100 fish.l⁻¹,
 - 0.5-1 gram: 7 – 10 fish.l⁻¹,
 - 2-5 grams: 5-7 fish.l⁻¹,
 - 10 grams: 5 fish.l⁻¹,
 - 100 grams: 0.5-0.75 fish.l⁻¹.





Nutrition aspects for larvae

Nutrition aspects for larvae



- First feeding - *Artemia salina* and nauplia of copepods and rotifers (2-3 dph),
- Weaning within RAS is applied between 19 – 21 dph (perch BW = 50 mg and pikeperch 150 – 180 mg),
- Artificial food: 200 – 300 μm , protein 45 - 60%, lipid level 18-20 %, vitamin C (100 - 200 $\text{mg}\cdot\text{kg}^{-1}$ dry diet), HUFA around 12 $\text{g}\cdot\text{kg}^{-1}$ dry diet) and phospholipids 90 - 95 $\text{g}\cdot\text{kg}^{-1}$ dry diet,
- Weaning of juveniles in the combination of pond and tank system in RAS is applied in juveniles about 0.2 – 0.5 grams by chironomids and its combination with a. food.





Positive effect of probiotics in percid culture

The enrichment of artemia or artificial food by some probiotics or prebiotics (such as: vitamin C, lactic bacterium or inulin) may increase survival and growth rates of larvae and juveniles of perch and pikeperch.





Fish manipulation and sorting

Fish manipulation and sorting



- Must be done gently,
- Optimal frequency once per fortnight,
- Separation of differently growing fish,
- Technique against cannibalism,
- Higher tolerance of fish for manipulation was evident in fish from controlled conditions compared to pond cultured fish.



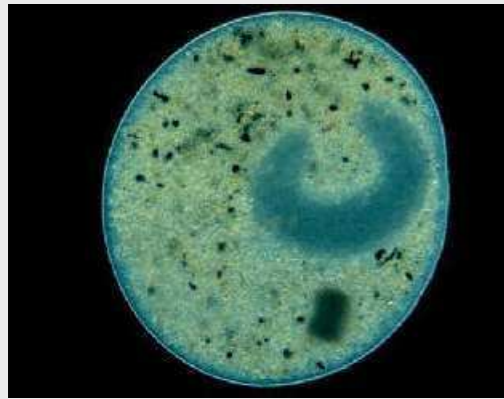


Maintenance of fish health

Maintenance of fish health



Ichtyophthirius multifiliis



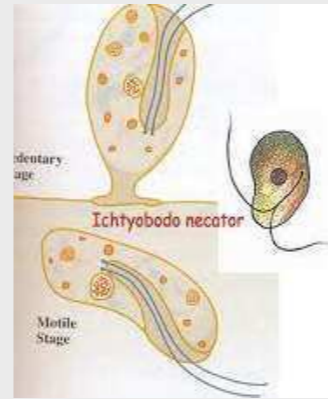
Chilodonella



Trichodina



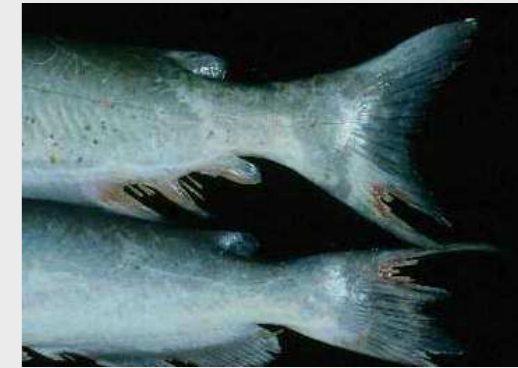
Ichtyobodo



Dactylogyrus



Bacterium Aeromonas



- Fish disease mainly in RAS,
- Main prevention: preventative, prophylactic and good husbandry and management activities,
- Main illness: zooparasites and bacterium *Aeromonas*,
- Treatments: chloramine T, formaline, hydrogen peroxide and salt.





Discussion