

Triploidit ($3n$) ja
Diploidit ($2n$)
kirjoloheet merellä



Tutkimusasetelma

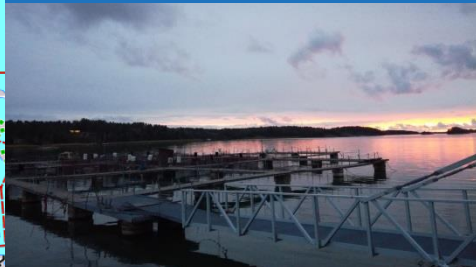
Onko 3n kirjolohella jotain erityispiirteitä, jotka tulisi huomioida kasvatuksessa?

H0=2n ja 3n eivät eroa (paitsi sukukypsyydessä)

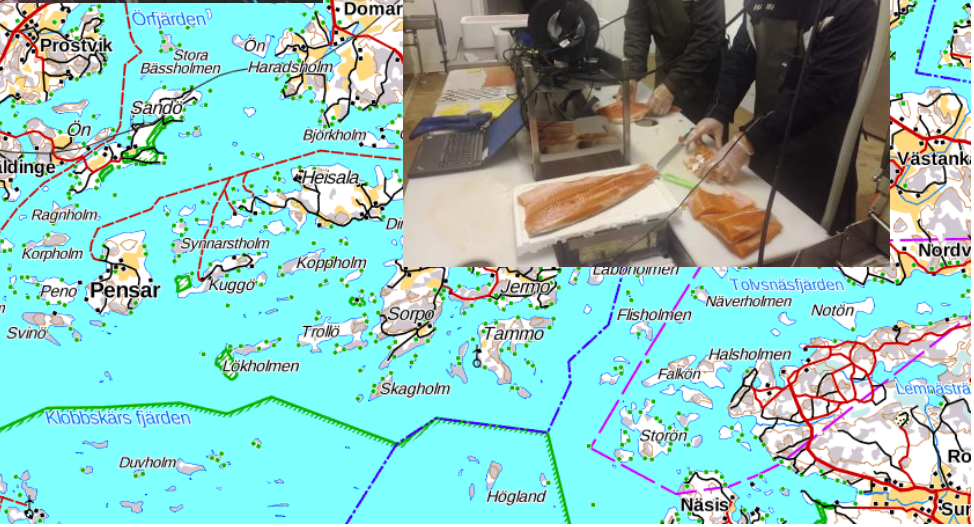
Kaksivuotinen merikoe, jossa tutkittiin erityisesti ruokintaa/ruokahalua, eläinterveyttä ja tuotannon laatua olosuhteiden vaihtelevuus huomioonottaen = kahdessa eri paikassa.



HAVERÖN LOHI

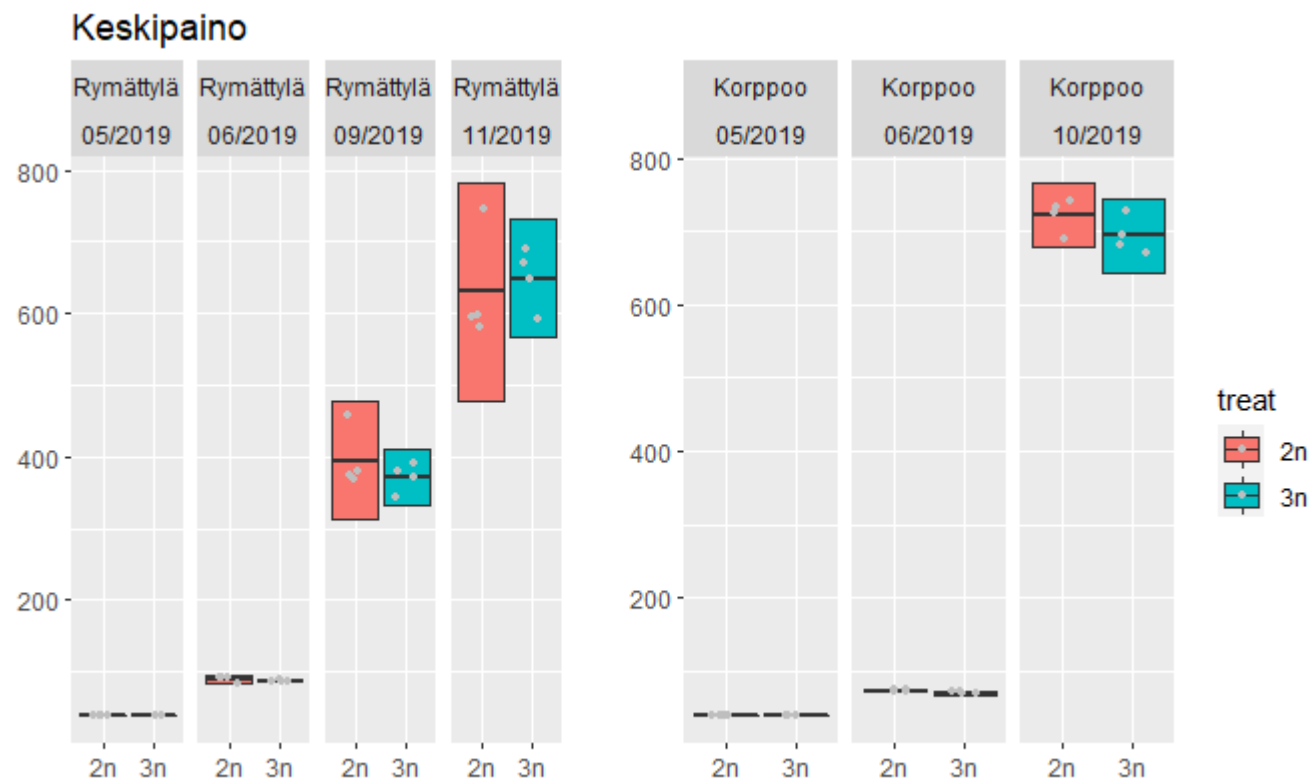


ammattiopisto
Livia

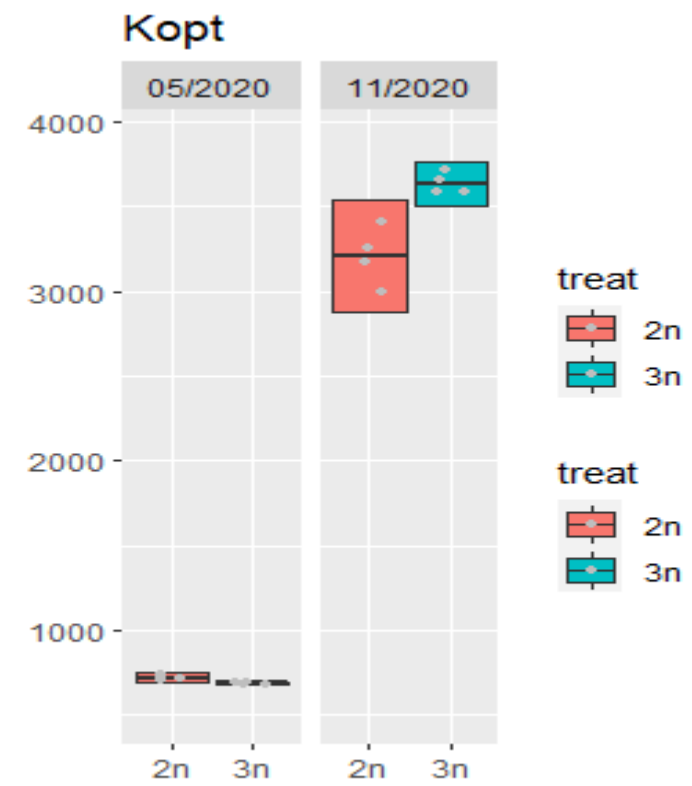
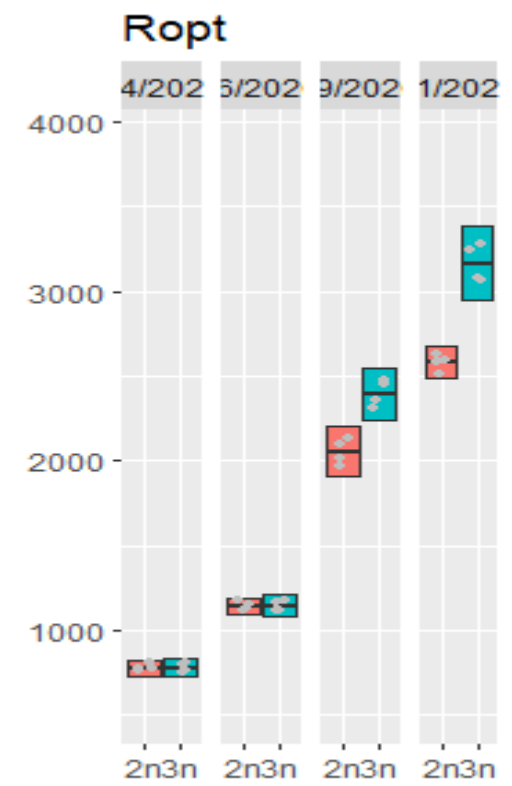
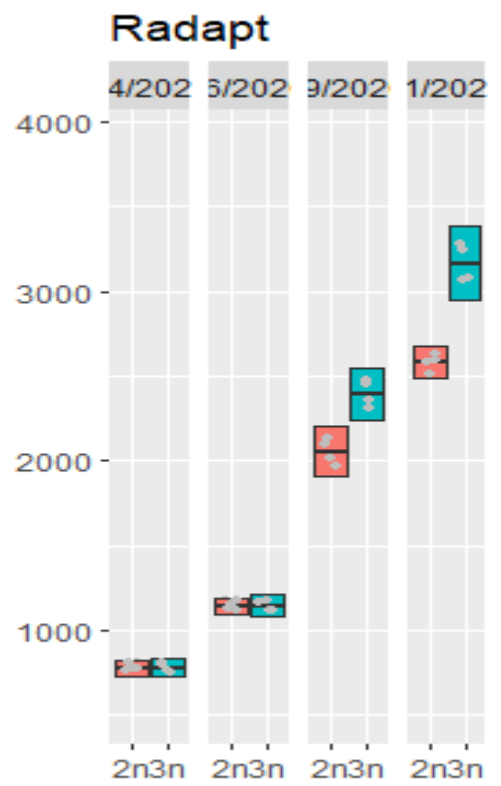


Keskipaino Merikesä 1

| | | mean | lcl | ucl | min | max |
|-----------|----|--------|--------|--------|--------|--------|
| Korppoo | 2n | 722.42 | 678.52 | 766.32 | 690.43 | 741.72 |
| Korppoo | 3n | 694.21 | 644.72 | 743.70 | 670.50 | 728.80 |
| Rymättylä | 2n | 630.31 | 478.62 | 782.00 | 580.27 | 745.74 |
| Rymättylä | 3n | 649.49 | 566.64 | 732.34 | 591.24 | 689.17 |



| | | | keskipaino | lcl | ucl | min | max |
|------------------|------------------|-----------|----------------|---------|---------|---------|---------|
| Korppoo | optimised | 2n | 3211.31 | 2877.68 | 3544.94 | 3000.64 | 3407.97 |
| Korppoo | optimised | 3n | 3635.37 | 3508.80 | 3761.94 | 3581.58 | 3715.32 |
| Rymättylä | adaptive | 2n | 3358.56 | 3226.77 | 3490.35 | 3311.02 | 3406.11 |
| Rymättylä | adaptive | 3n | 3843.24 | 3724.51 | 3961.97 | 3800.40 | 3886.07 |
| Rymättylä | optimised | 2n | 2581.20 | 2485.19 | 2677.21 | 2515.52 | 2631.76 |
| Rymättylä | optimised | 3n | 3167.00 | 2944.66 | 3389.34 | 3064.03 | 3285.07 |



| | | Kasvu | Eloonjäänti | Rehuteho | Erävoitot | |
|-----------------------|-----------|----------|-------------|----------|-----------|--|
| Merikesä1 | 2n | 0 | 0 | 0 | 0 | |
| | x | 2 | 2 | 1 | 5 | |
| | 3n | 0 | 0 | 1 | 1 | |
| Merikesä2 | 2n | 0 | 1 | 1 | 2 | |
| | x | 1 | 2 | 2 | 5 | |
| | 3n | 2 | 0 | 0 | 2 | |
| Molemmat kesät | 2n | 0 | 1 | 1 | 2 | |
| | x | 3 | 4 | 3 | 10 | |
| | 3n | 2 | 0 | 1 | 3 | |



Sukukypsyminen

| | | | sukukypsyys% |
|-----------|-----------|----|--------------|
| Korppoo | optimised | 2n | 82 |
| Korppoo | optimised | 3n | 0 |
| Rymättylä | adaptive | 2n | 69 |
| Rymättylä | adaptive | 3n | 0 |
| Rymättylä | optimised | 2n | 72 |
| Rymättylä | optimised | 3n | 0 |

| | | Gonadi% | lcl | ucl | min | max | |
|-----------|-----------|---------|------|-------|------|-------|--|
| Korppoo | optimised | 9.18 | 5.82 | 12.54 | 4.03 | 14.75 | |
| Rymättylä | adaptive | 6.65 | 4.32 | 8.98 | 3.88 | 10.55 | |
| Rymättylä | optimised | 7.90 | 4.26 | 11.54 | 4.30 | 12.53 | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |



Fileoinnissa havaitut muotovirheet


| Paikka | ruokinta | sukukyp | ploidia | mean |
|------------------|------------------|----------|-----------|-------------|
| Korppoo | optimised | 0 | 2n | 0.00 |
| Korppoo | optimised | 0 | 3n | 0.10 |
| Korppoo | optimised | 1 | 2n | 0.01 |
| Rymättylä | adaptive | 0 | 2n | 0.05 |
| Rymättylä | adaptive | 0 | 3n | 0.10 |
| Rymättylä | adaptive | 1 | 2n | 0.05 |
| Rymättylä | optimised | 0 | 2n | 0.03 |
| Rymättylä | optimised | 0 | 3n | 0.15 |
| Rymättylä | optimised | 1 | 2n | 0.05 |

Research Article

A comparison of triploid and diploid Atlantic salmon (*Salmo salar*) performance and welfare under commercial farming conditions in Norway

Angelico Madaro  , Sissel Kjølglum, Tom Hansen, Per Gunnar Fjelldal & Lars H. Stien

Published online: 28 May 2021

 Download citation  <https://doi.org/10.1080/10454438.2021.1916671>



aquaculture companies. Diploid and triploid groups of the same genetic line were farmed in western, mid, and northern Norway under commercial conditions from seawater transfer until slaughter. Overall, triploid salmon exhibited reduced survival, higher incidence of emaciated fish, and scored, on average, a lower quality rating during primary processing. The results highlight the need for further research on how to improve the welfare and performance of triploid salmon in commercial aquaculture operations.



HEALTH CHALLENGES IN TRIPLOID SALMON

Amongst other things, it has transpired that triploid salmon have a higher growth rate, provided that they are given feed that covers their nutritional needs. They also have different requirements to diploid salmon in terms of their environment, including a different need for oxygen and their optimum temperature.

A lack of understanding of the needs of triploid salmon has unfortunately resulted in a variety of health challenges. Hard work has been carried out to resolve these, and extensive mapping of the needs has been performed.

We now know that triploid salmon have a higher growth rate and therefore have different needs in terms of the nutritional composition of their feed. With adjustments to feed composition, such as the addition of extra phosphorus, and different protein content in the feed, we can avoid the classic health problems of triploid salmon such as cataracts and skeletal deformities.



Samaan aikaan muualla



Aquaculture

Volume 552, 15 April 2022, 737975



Triploid Atlantic salmon × brown trout hybrids have similar seawater growth and welfare issues as triploid Atlantic salmon, but both were heavier at harvest than their diploid counterparts

Thomas W.K. Fraser ^a  , Tom J. Hansen ^a, Sofie C. Remø ^b, Rolf Erik Olsen ^c, Per Gunnar Fjellidal ^a

The growth of triploid salmon in seawater is relatively inconsistent compared to diploids with reports of lower (Fraser et al., 2013), equal (Smedley et al., 2016), or greater growth (O'Flynn et al., 1997). The underlying cause of the inconsistency remains unknown, but may be explained by differences in temperature optima (Sambraus et al., 2018), nutritional requirements (Taylor et al., 2015; Fjellidal et al., 2016), or the optimal timing of sea transfer (Taylor et al., 2011). Recently, we have also

Highlights

- Hybridisation had no effect on harvest size, vertebral deformities, cataracts, or body shape in triploids
- Triploid hybrids had better fillet colouration and a smaller gut than triploid salmon
- Triploid salmon were heavier at harvest than diploid salmon
- Triploids had more vertebral deformities and cataracts than diploid salmon
- Diploid hybrids grew much slower than diploid salmon

Samaan aikaan muualla

Home > News > Triploid salmon use to be paused in Norway due to welfare concerns

Triploid salmon use to be paused in Norway due to welfare concerns



“One of the experiences with triploid salmon is that it seems to be more exposed to bacterial and viral diseases. As a result, NRS has had a dialogue with the Ministry of Trade and Industry, where the Ministry has come to the conclusion that they will adjust the condition of use of sterile fish until there is a decision of the authorities on whether triploid production is fish welfare sound or not.”

Meidän kokeissa kirjolohella ei eroa kuolleisuudessa, kasvu vähintään yhtä hyvää, selkärankaviat vähän mietityttävät...

Miten meidän tuotannossa, pitäisikö olla huolissaan?

Tautialtistuskokeet?

Muotovirheet & Kasvu > tarkastelu koko elinkierron aikana, eri ruokintatekniikat/rehut, painekäsittelyt...?



RAS-kala merellä.





*Miten eri vaiheissa vuotta siirretyt ras-alkukasvatetut kalat lähtevät merellä pärjäämään?
H0=talven puute yhdistettynä siirtoon heikentää kalojen kasvua.*



Luke
LUONNONVARAKESKUS
Laukaa

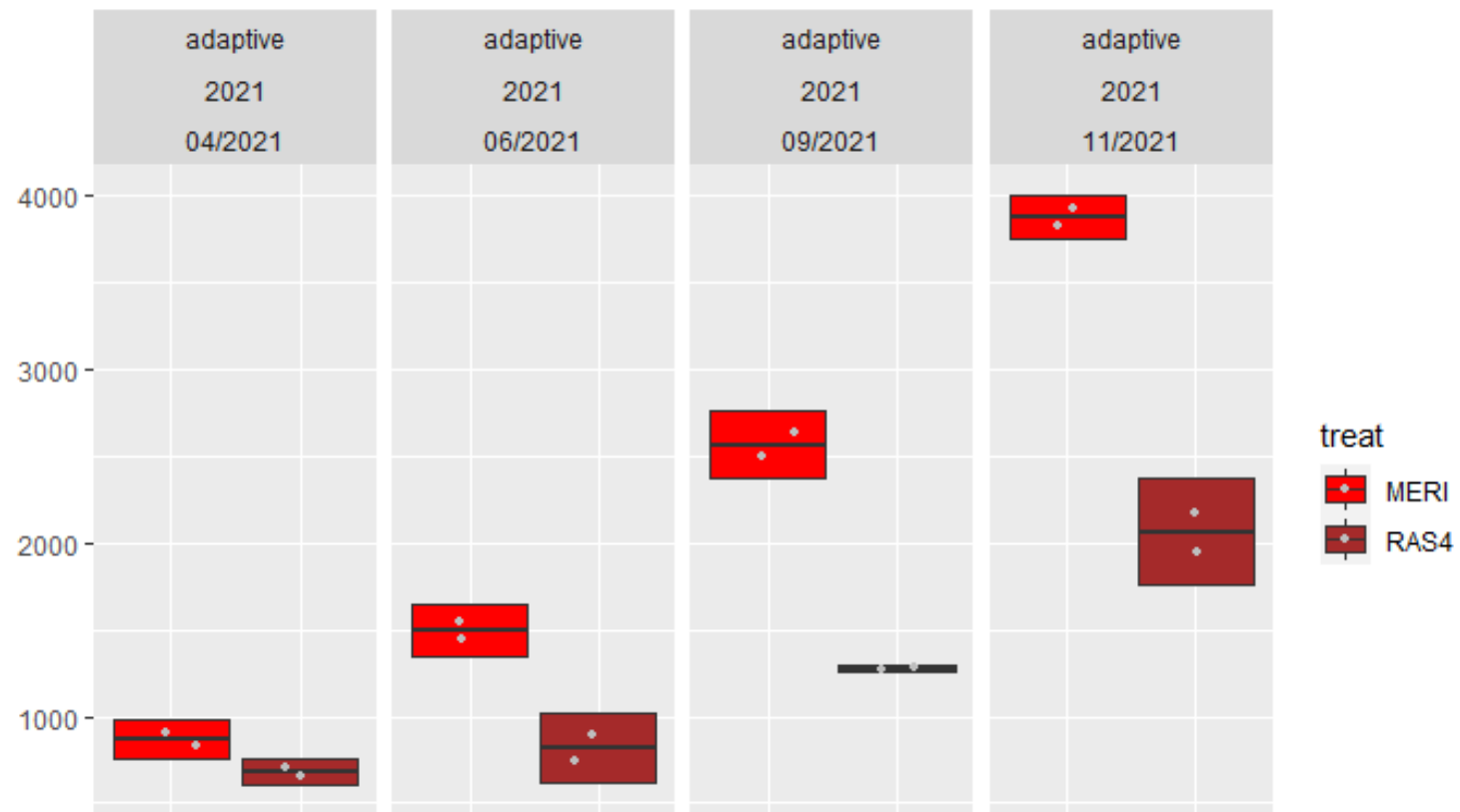
Luke
LUONNONVARAKESKUS
Rymättylä
HAVERÖN LOHI

Luke
LUONNONVARAKESKUS


EUROOPAN MERI- JA KALATALOUSRAHASTO
SUOMEN TOIMINTAOHJELMA
2014-2020

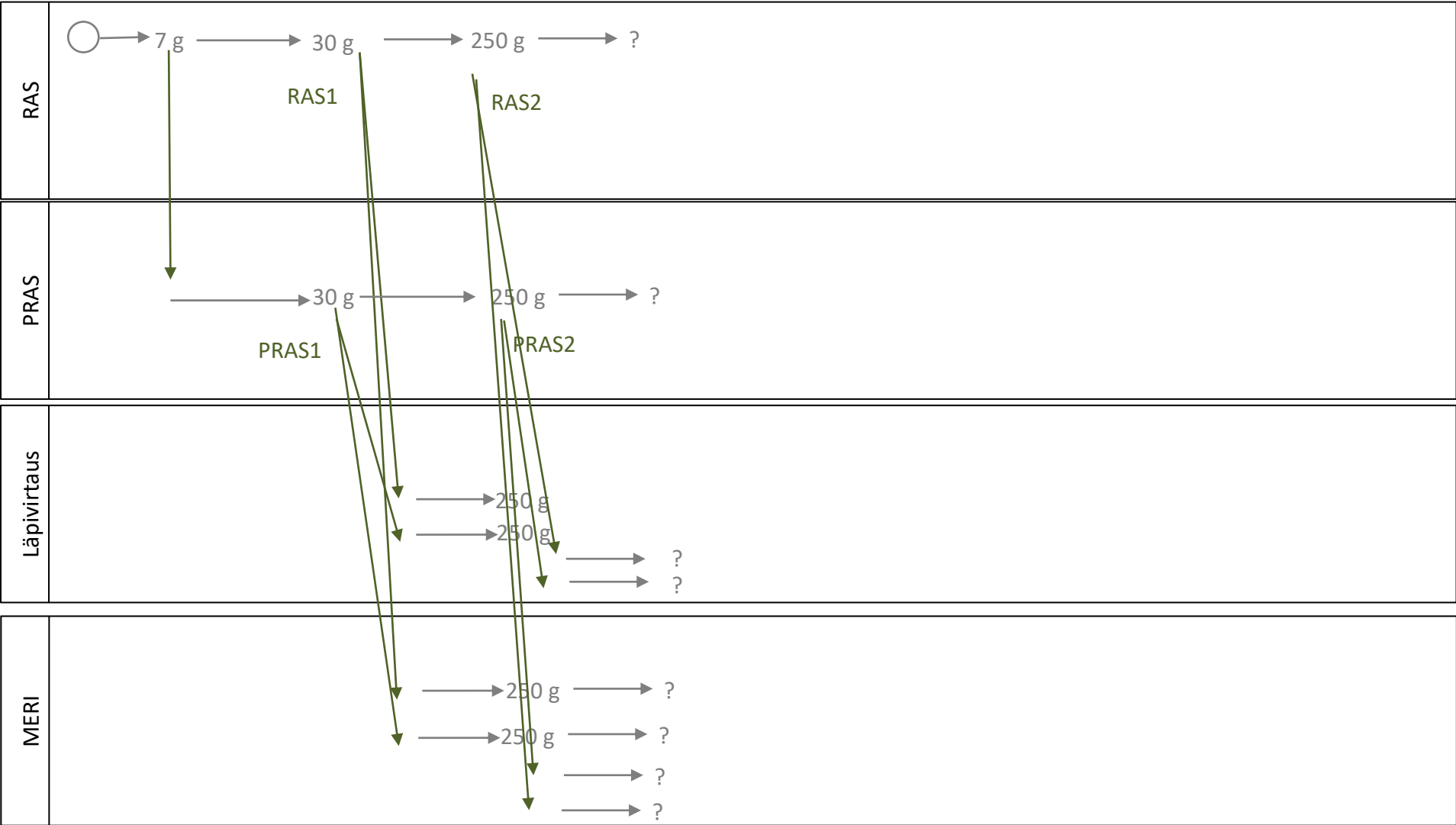


Keskipaino



| 2022 | | | | | | | | | | | | 2023 | | | | | | | | | | | |
|------|--|--|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|--|--|
|------|--|--|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|--|--|

| | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|----|----|----|---|---|---|---|---|---|---|---|---|----|----|----|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|----|----|----|---|---|---|---|---|---|---|---|---|----|----|----|



Smaller smolts grow quicker at sea

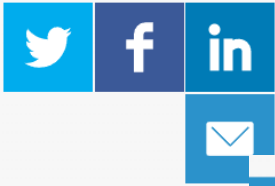
· RECIRCULATING AQUACULTURE SYSTEMS (RAS)

· PRODUCTION SYSTEMS



by The Fish Site
5 March 2018, at 9:58am

Larger salmon post-smolts do not grow as well in marine cages as traditional 100g smolts, according to new research.



A trial undertaken as part of the [CtrlAQUA](#) project showed that fish that were transferred from land-based facilities at 100g grew better than those transferred at 600g, surprising the researchers involved.

The larger post-smolts ate little during the first three weeks in the sea, and had poorer growth in the summer



Time of year for sea transfer decides RAS strategy



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“The conditions that fish farmers should give the salmon in RAS facilities seem to depend on which time of year the fish are to be transferred to sea”, says Ytrestøyl.

Meidän kokeissa aikainen kala pelletin syö.

> Miten meidän tuotantokiertoamme tulevat muotoutumaan?

>> Pitäisikö olla huolissaan siitä, miten saada myöhäinen kala syömään?

