

Otolith



The study of agricultural science is tough work.

The problem is that there are individual differences and that the verification takes a long time.

For example, there is a inspection improvement of flowers.

Irradiate and cause mutation in seed.

Then grow until the flowers bloom.

Once the desired color has bloomed, collect the seeds.

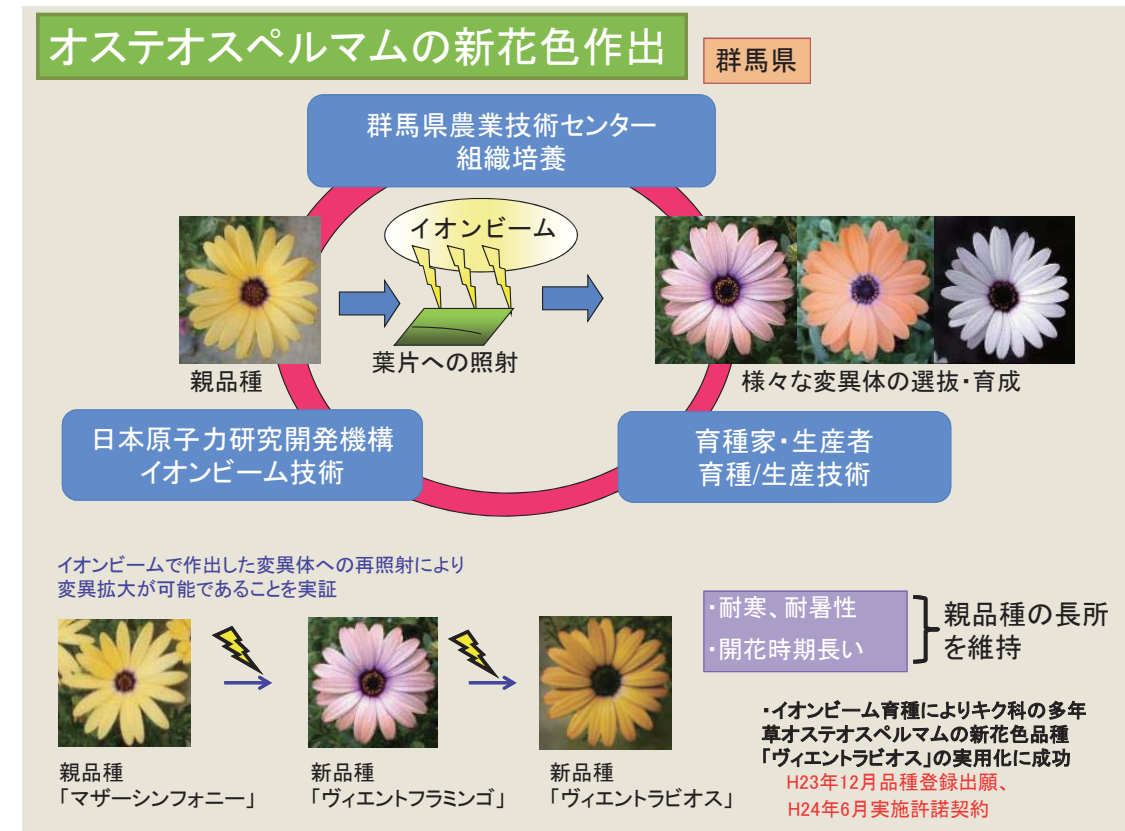
If the seed is grown and the same color flower blooms,
the breed improvement was successful.

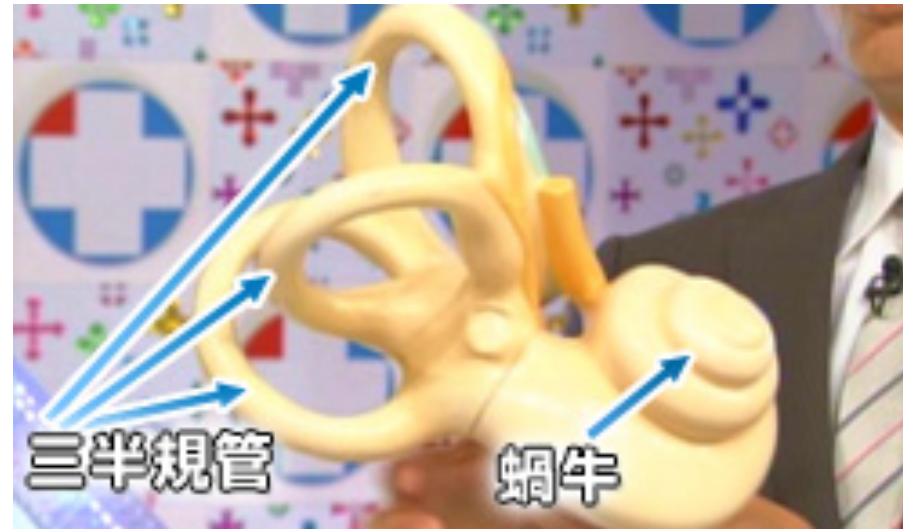
Of course, if you choose a plant with a short flowering cycle,
the inspection time will be shorter.

But consumers don't always want it.

They need a very long time to test and get results.

I think it's a research with a lot of patience.

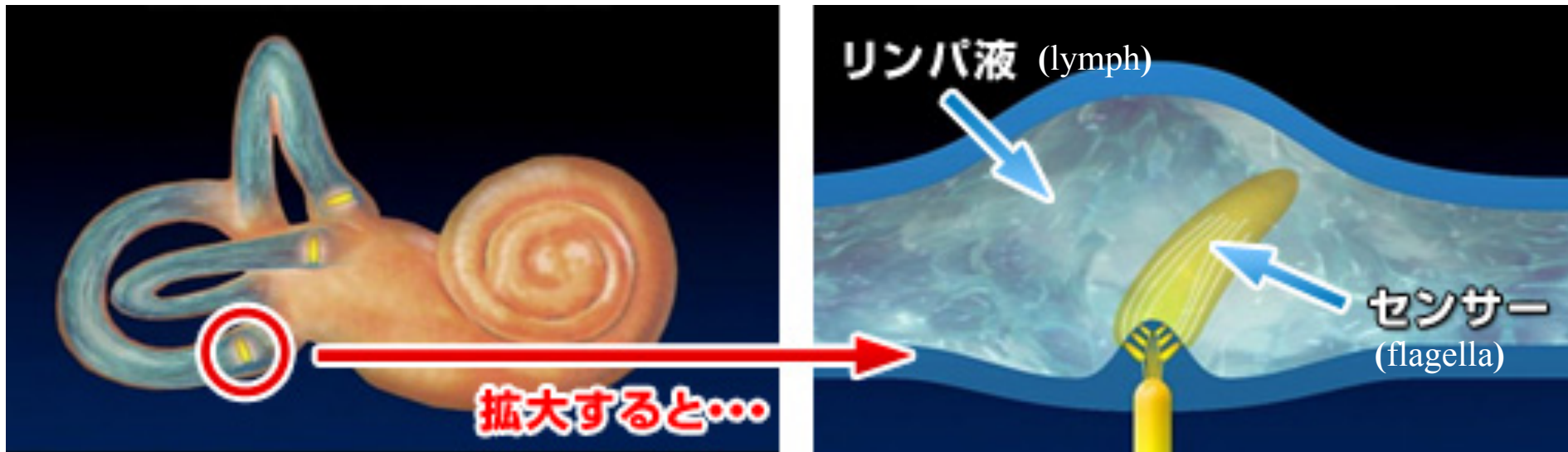


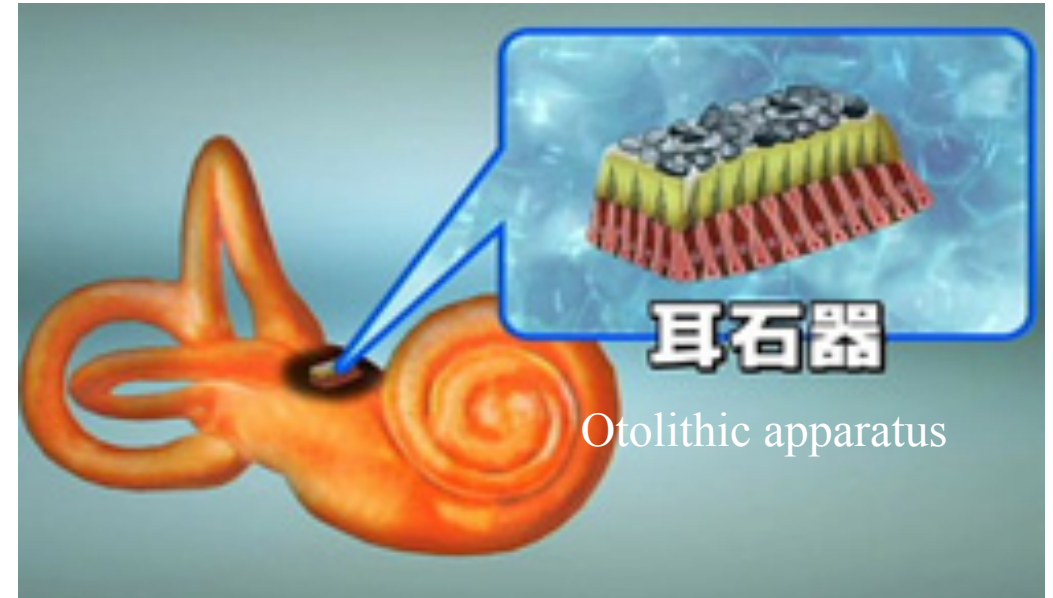
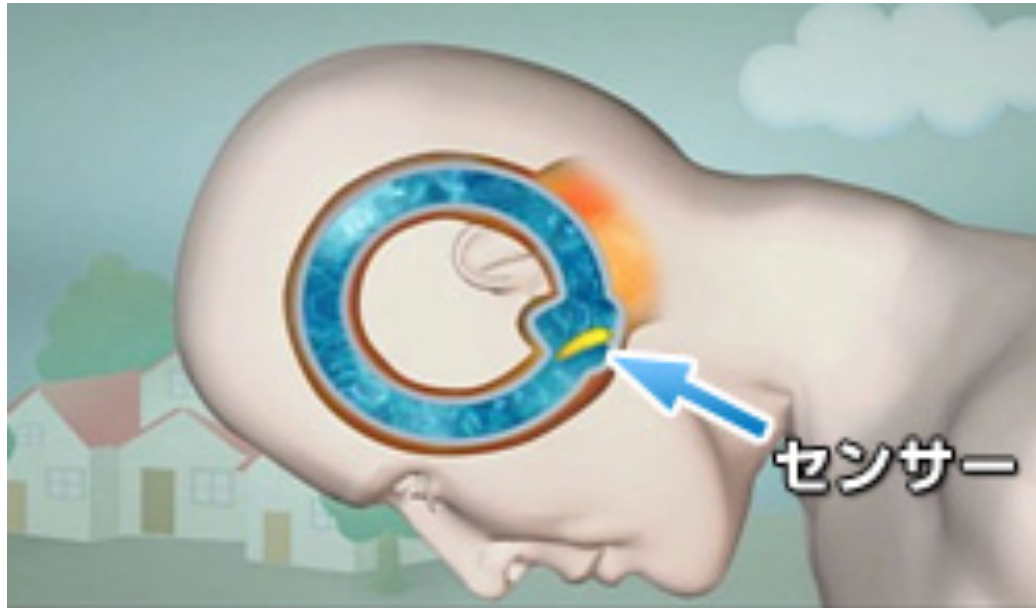


(Semicircular canals)

(cochlea)

Cochlea plays a role of microphone.
 Semicircular canals senses the position of the body when it tilts or turns.
 The semicircular canal is filled with lymph fluid.
 And this sensor senses the flow of lymph fluid





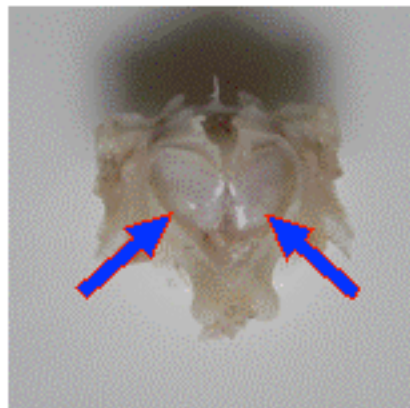
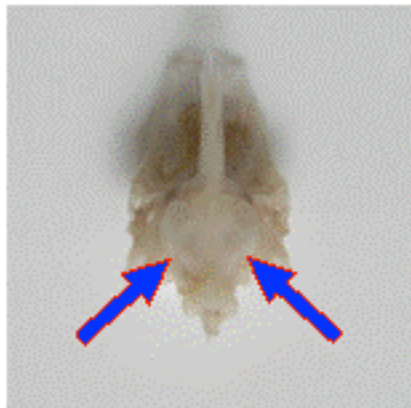
The otoliths sense speed and gravity.

Inside the semicircular canal, the space with otoliths and all three tubes are connected, and lymph fluid is coming and going.

Since the otoliths are heavier than lymph, when linear acceleration is applied, inertia works for otoliths.

At that time, the otoliths apparatus can sense the speed.

Vertebrates usually have these organs

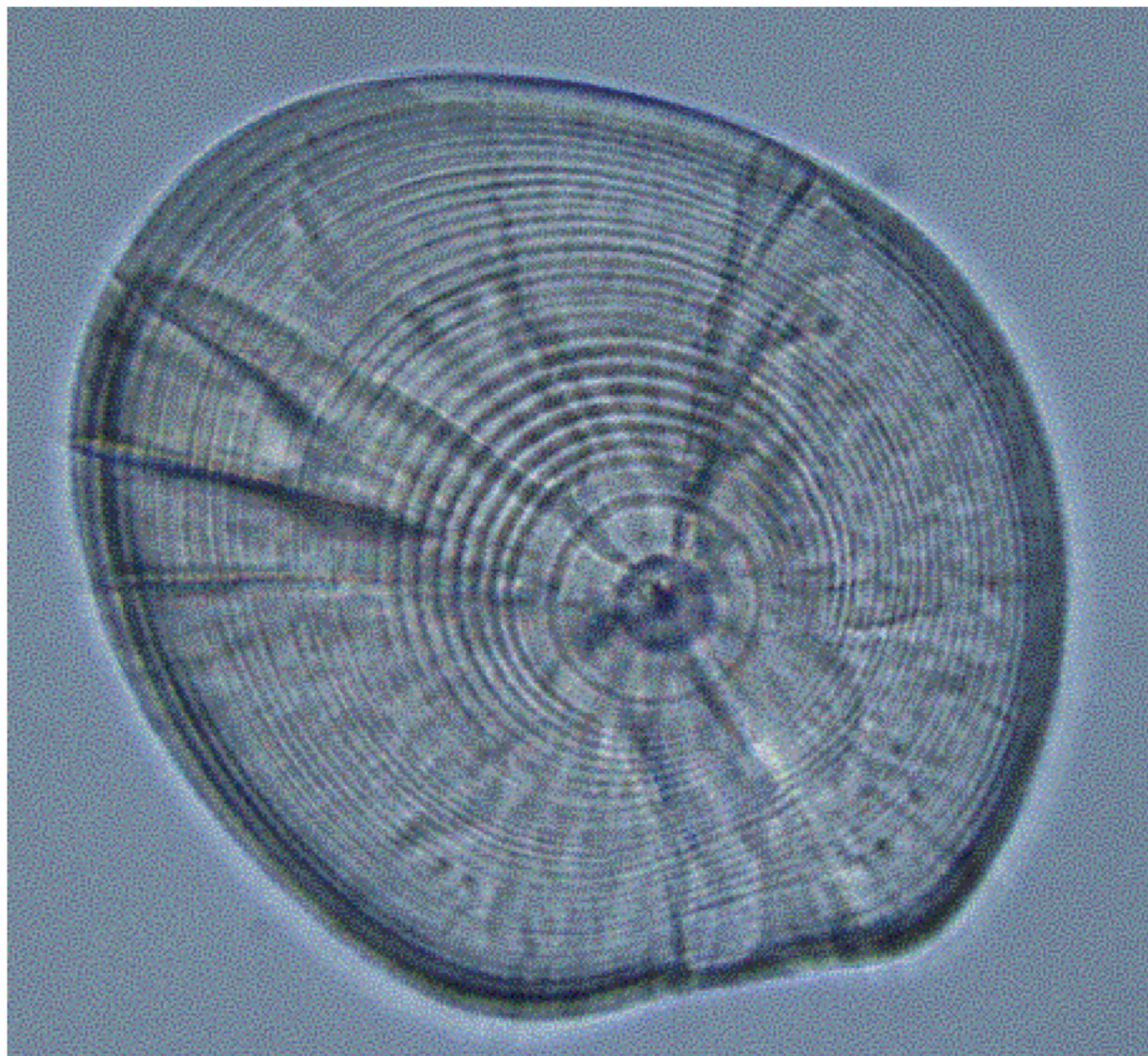


<http://www.fklab.fukui.fukui.jp/ss/jiseki/jisekinotorikata.html>

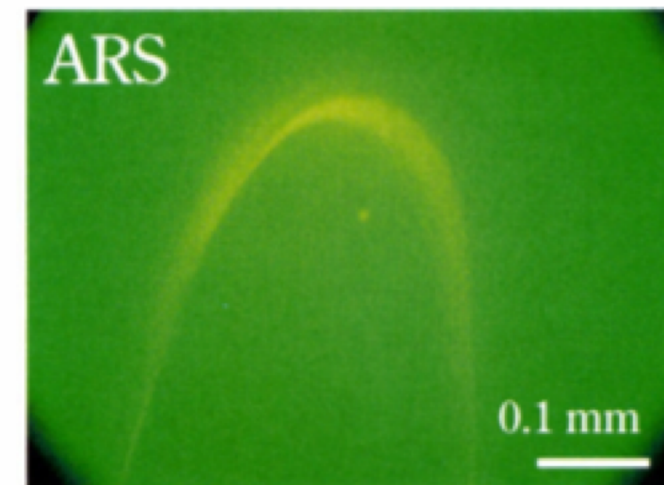
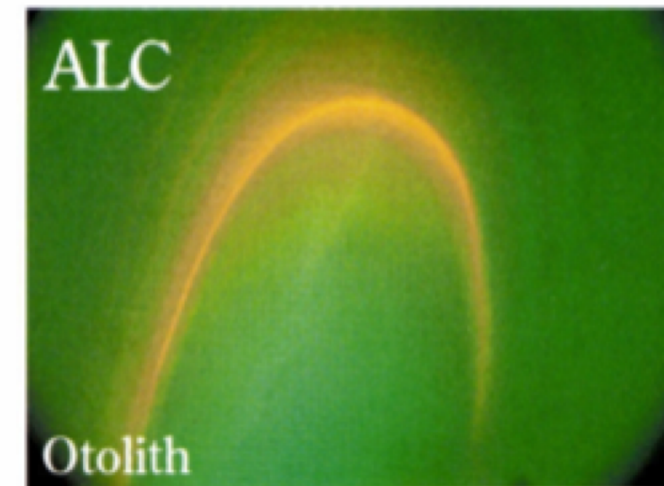
Otoliths of various fish



Growth ring

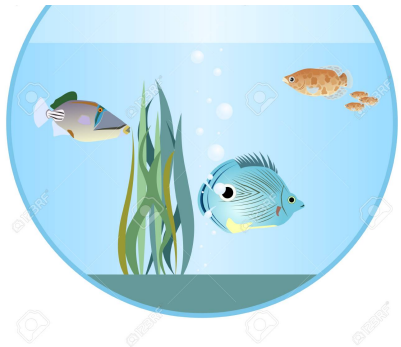


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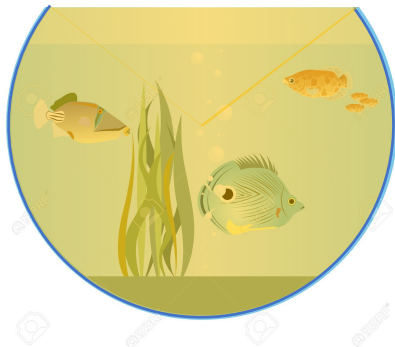


Suisanzoshoku, 51(2003), p327-335.

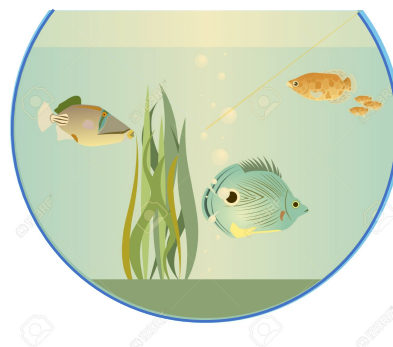
First day



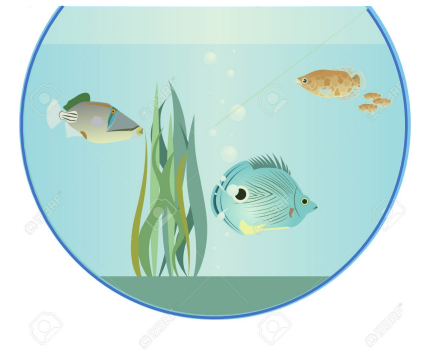
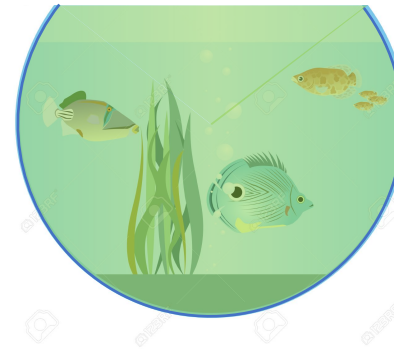
2nd day



3rd day

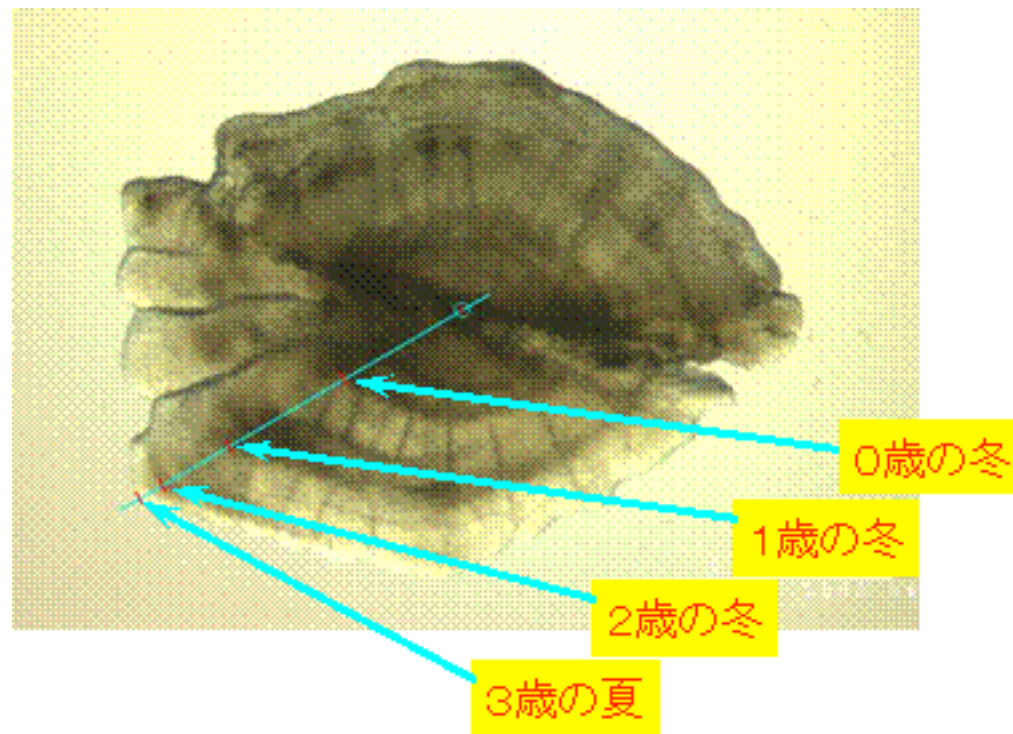


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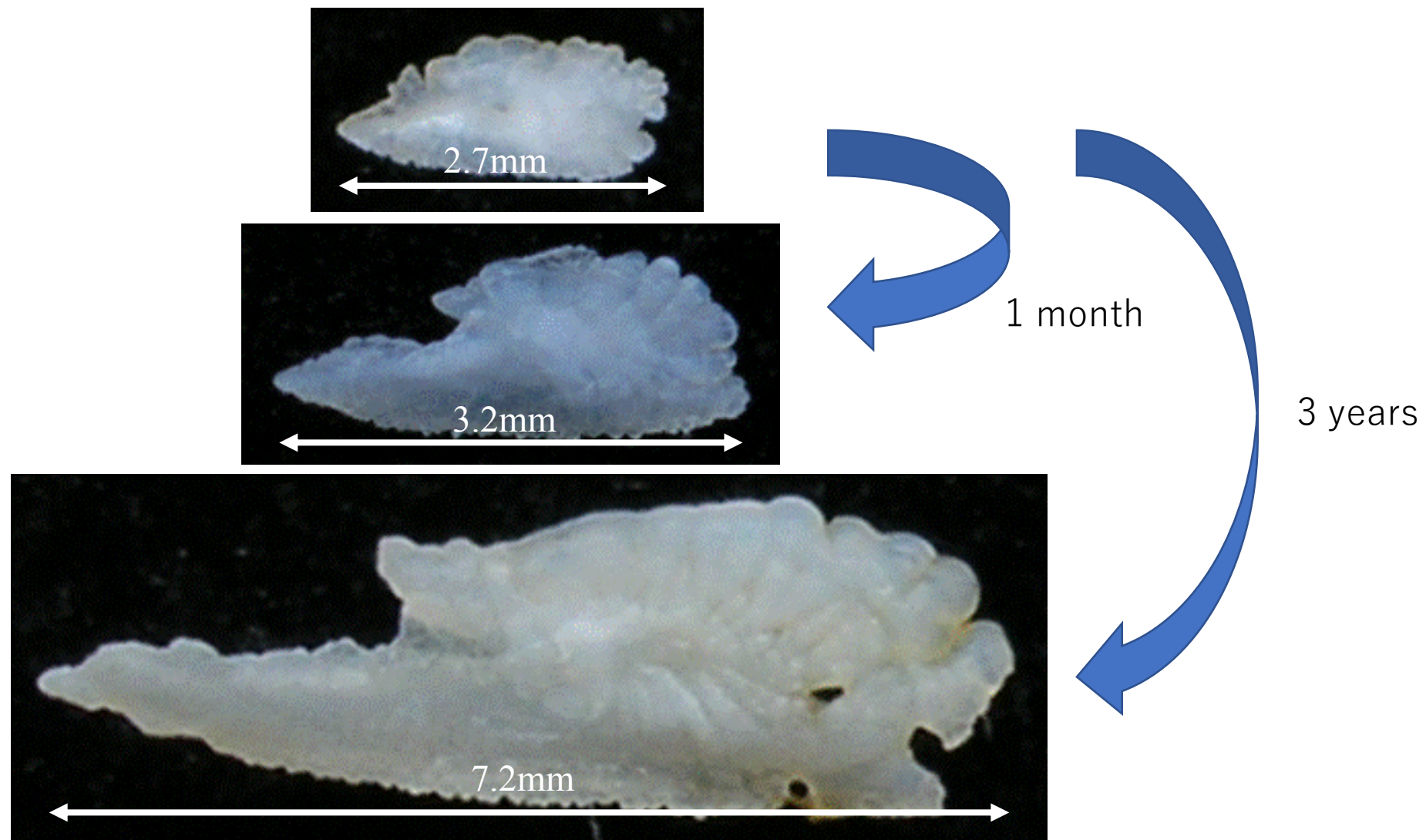
The fish grew in water with different concentrations of fluorescent every 24 hours. Fluorescent substances in water are taken up by otoliths. The stripe pattern appearing on the otolith coincided with the concentration change of the fluorescent substance.

Annual ring

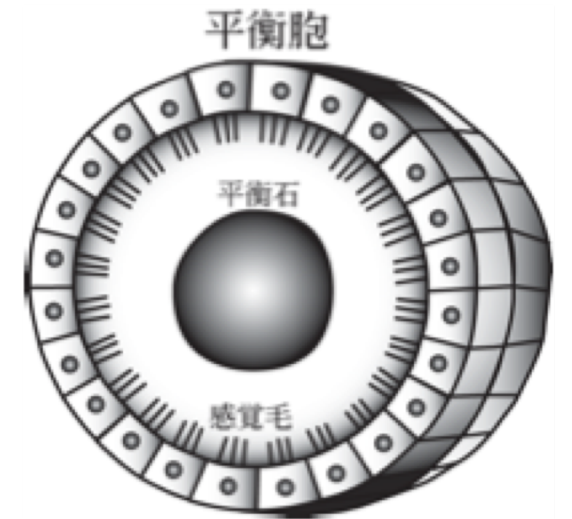


<http://www.fklab.fukui.fukui.jp/ss/jiseki/jisekinokazoeckata.html>

Yellowtail's otolith

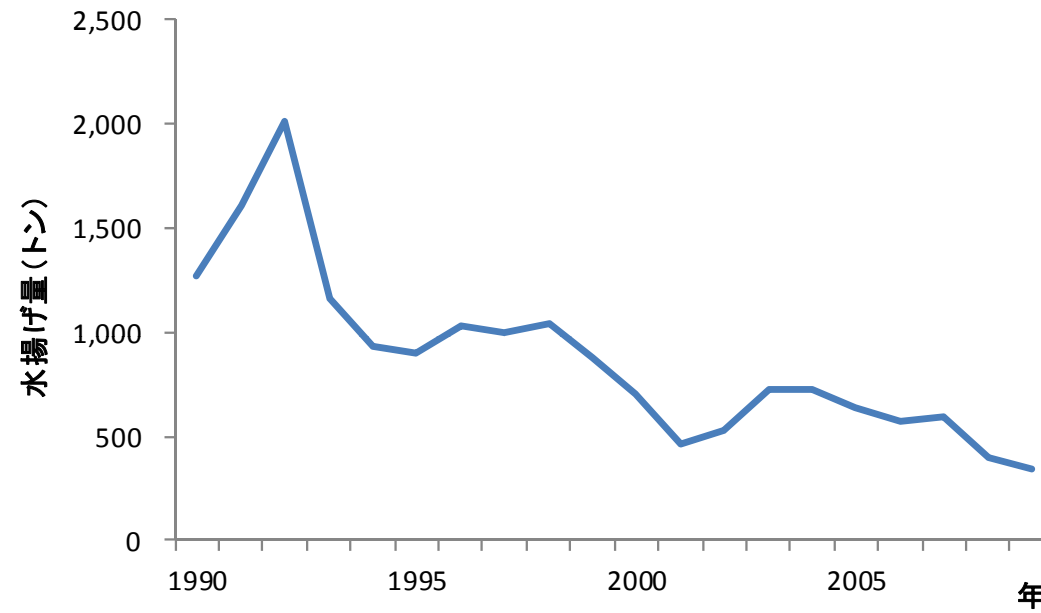


Invertebrate



宇宙生物科学, 16(2002), 47-55.

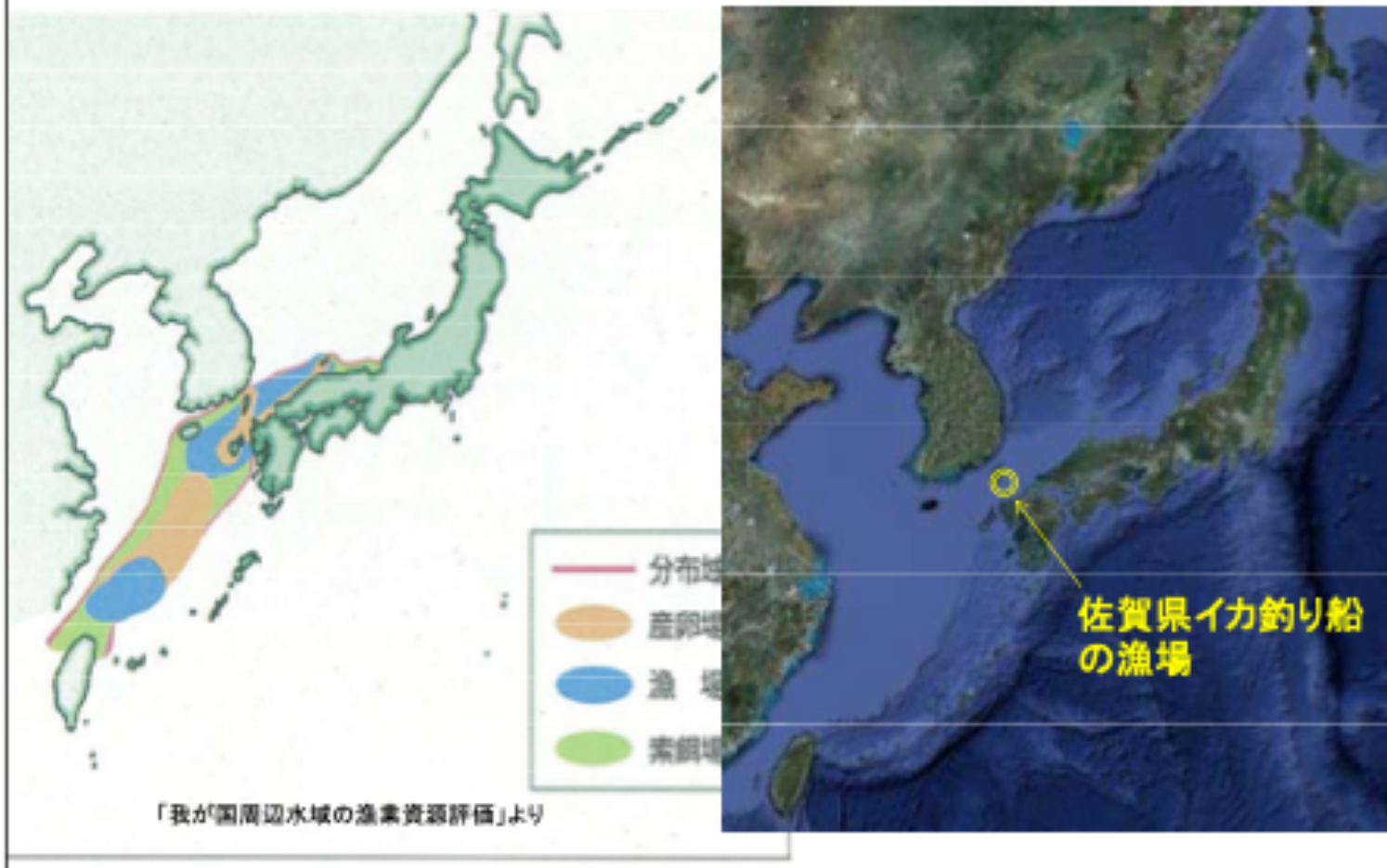
The catch of squid in Saga



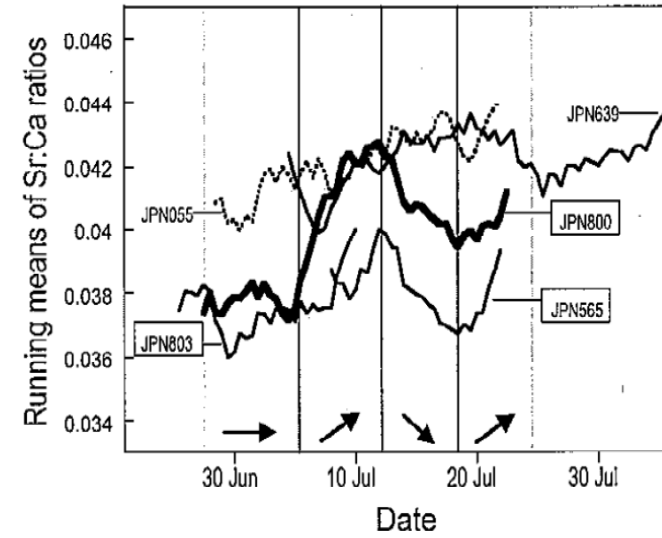
農林水産統計年報からの推定値

6

日本周辺の生息海域



スルメイカの回遊ルートの特明

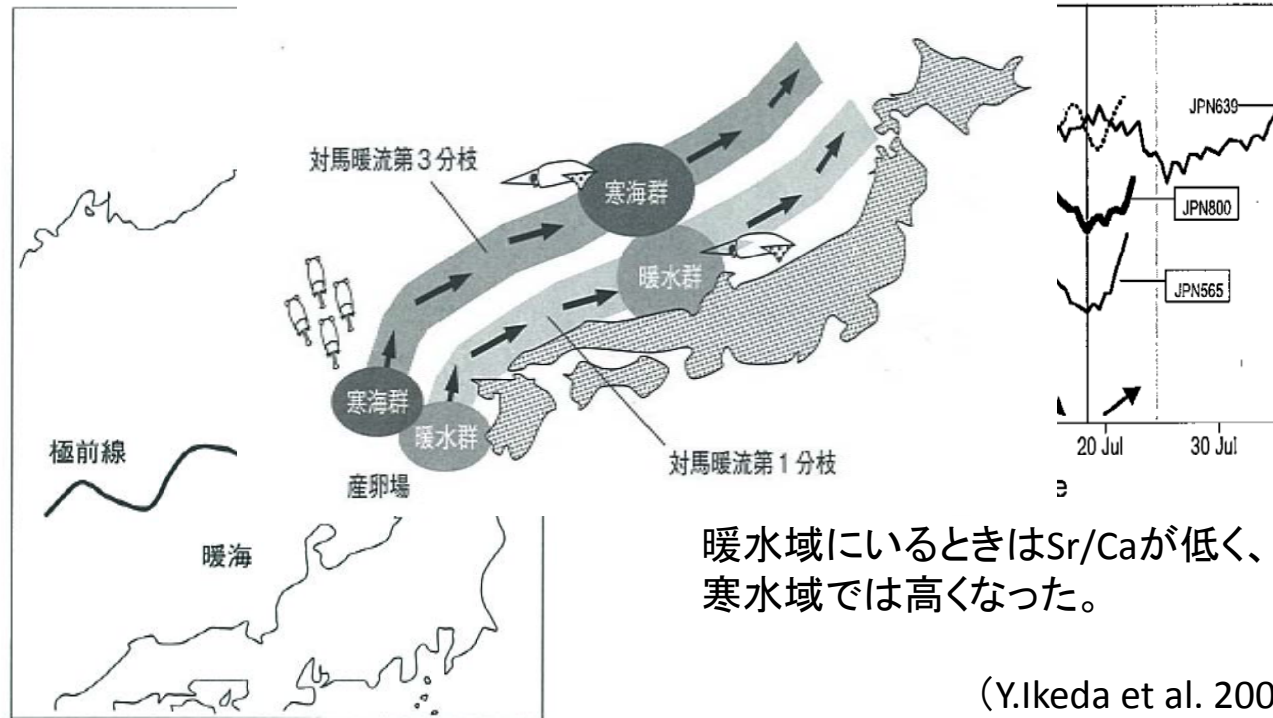


暖水域にいるときはSr/Caが低く、
寒水域では高くなった。

(Y.Ikeda et al. 2003)

池田譲 「新鮮イカ学」より

スルメイカの回遊ルートの説明

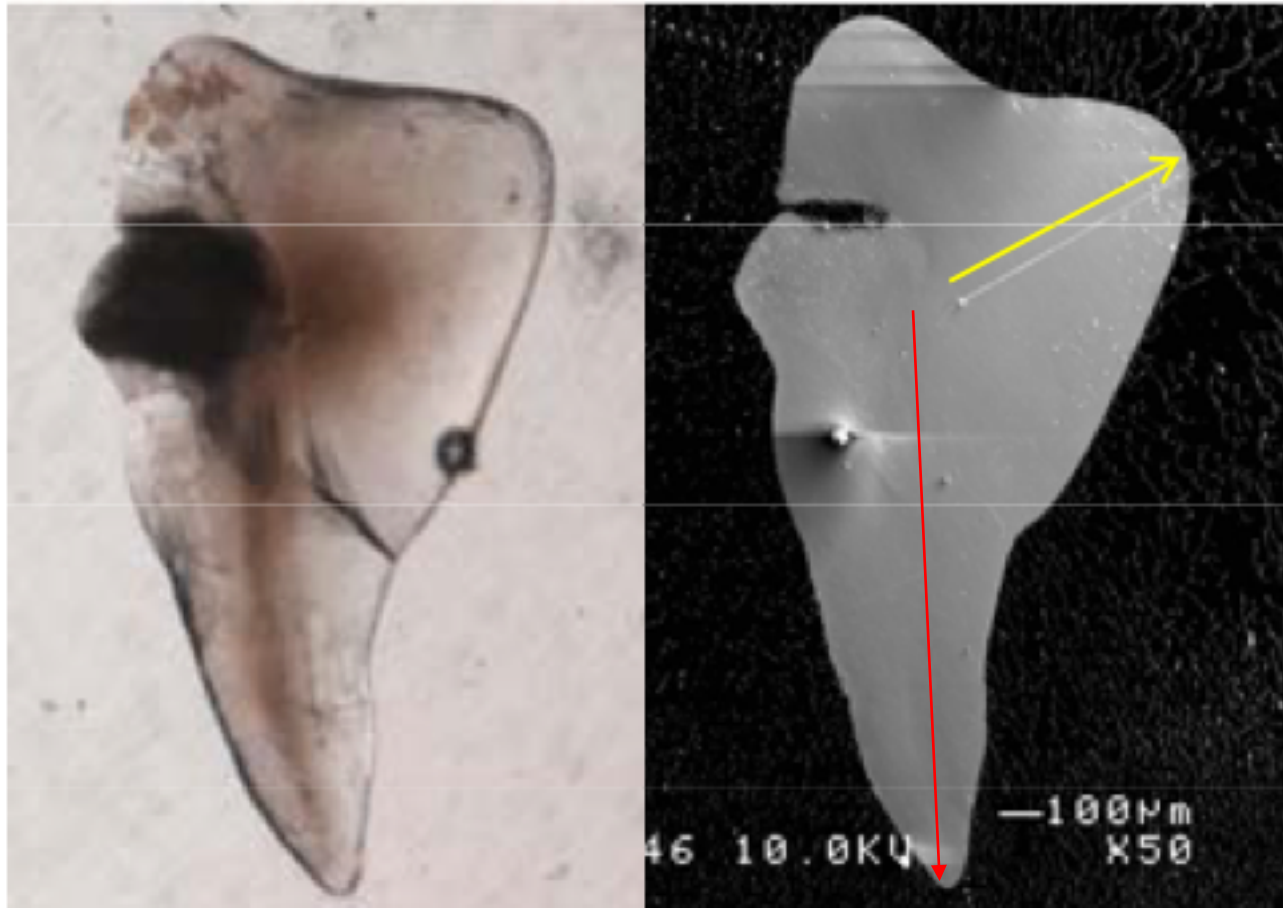


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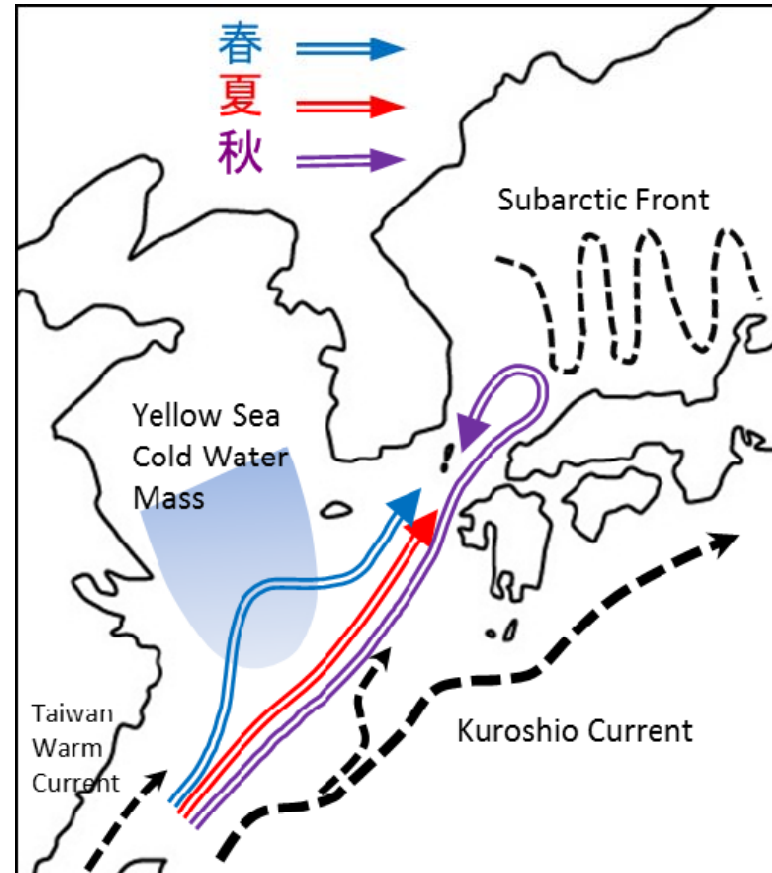
池田譲 「新鮮イカ学」より

平衡石のSr/Caをラインに沿って連続測定

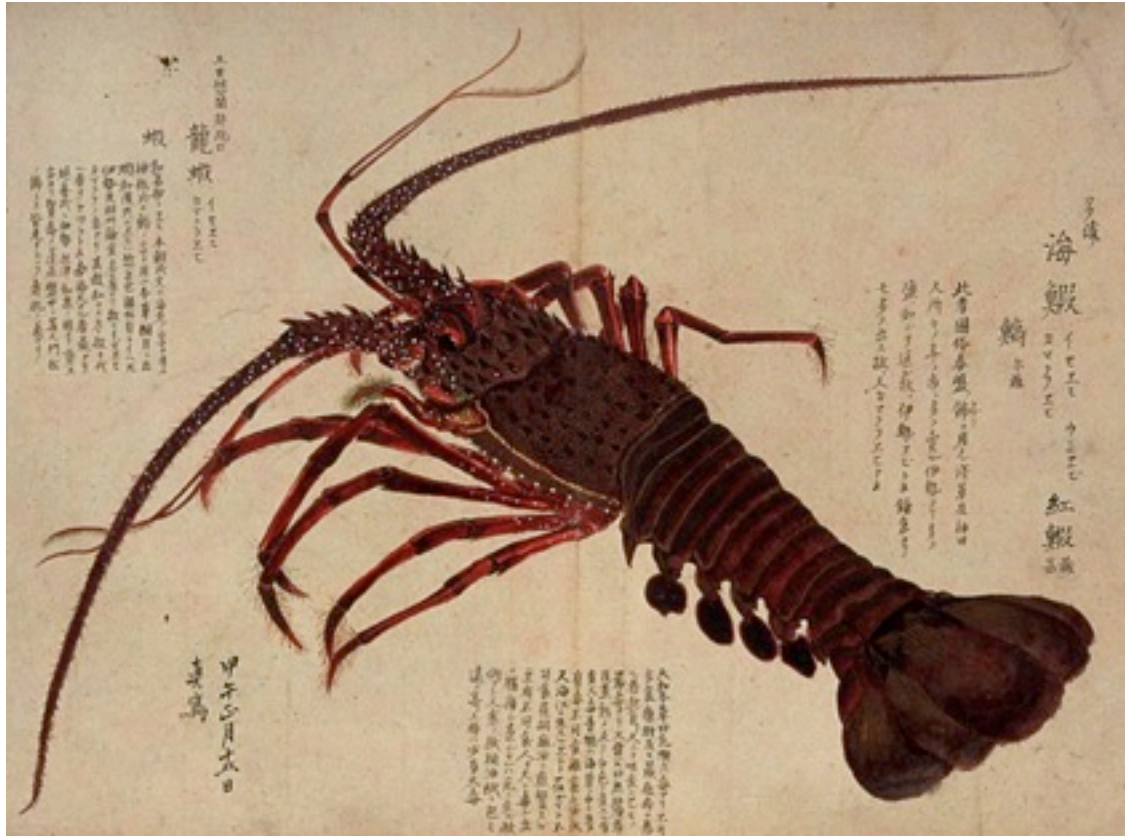


<https://www.pref.saga.lg.jp/kiji00320179/index.html>

推定される移動経路モデル

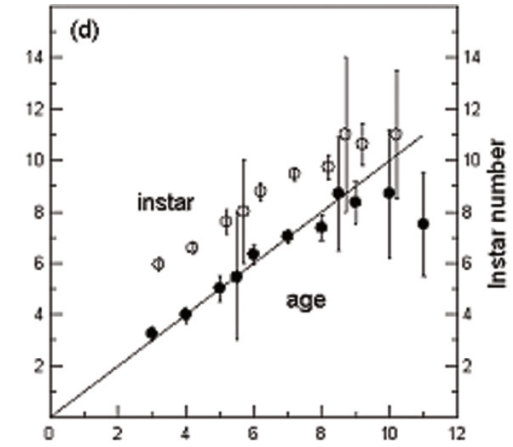
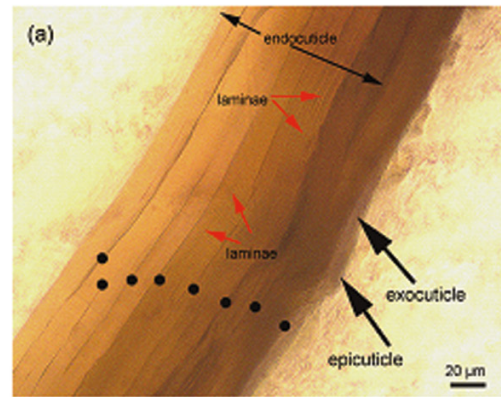


甲殼類(Crustacea)

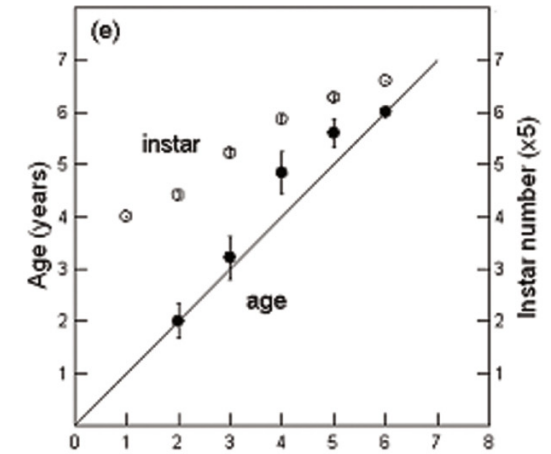
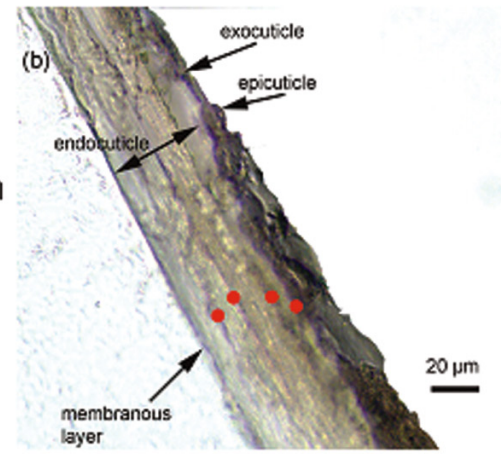


Eyestalk

Snow
crab



Northern
shrimp



[Canadian Journal of Fisheries and Aquatic Sciences](#) 69(11) · November 2012, p1728-1733.