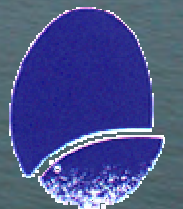


# Validation in commercial conditions of the response to selection of the European flat oyster *Ostrea edulis* for resistance to *Bonamia ostreae*

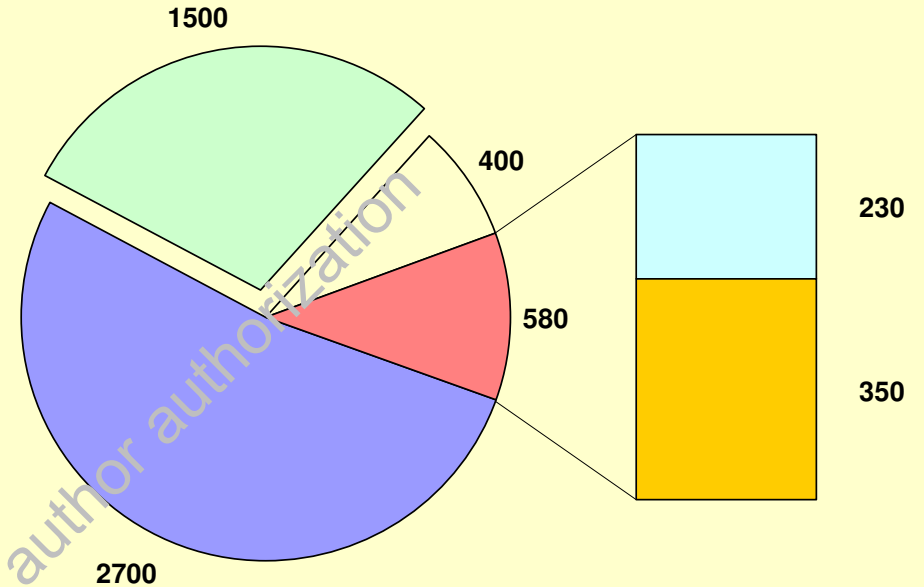
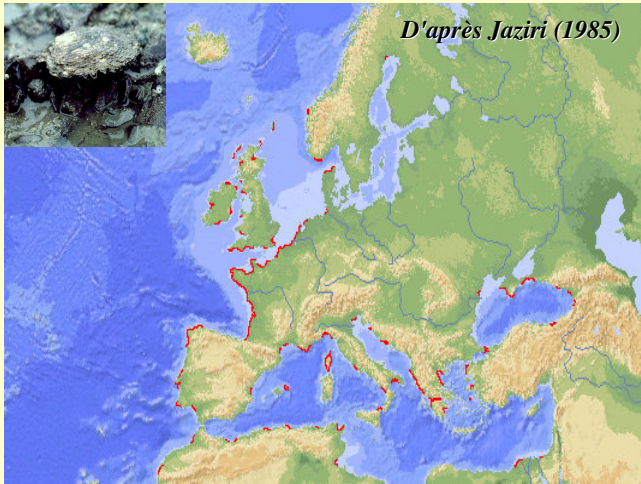


E. Bédier, A. Langlade, S. Angeri, R. Brizard, V. Nerlovic, P. Glize, P. Haffray

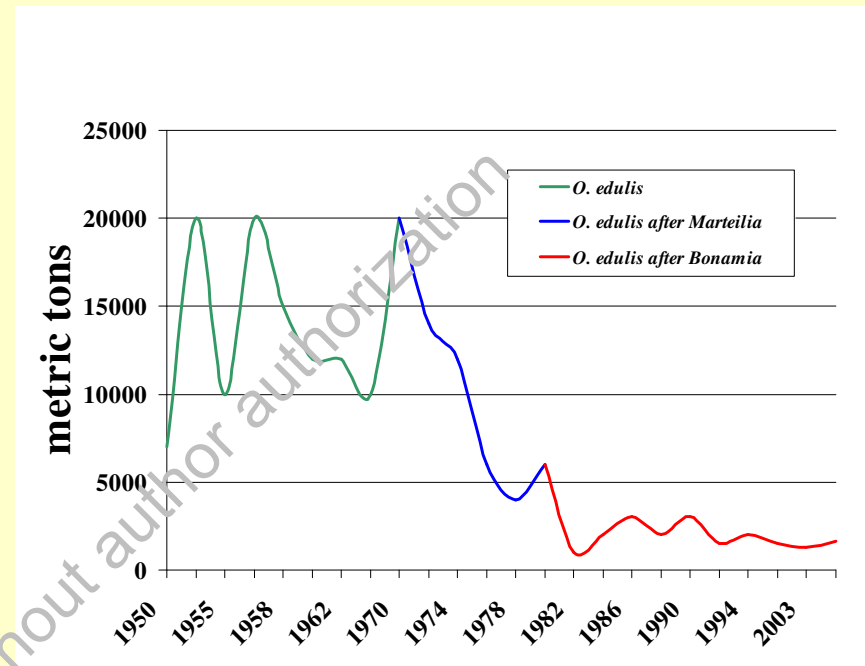
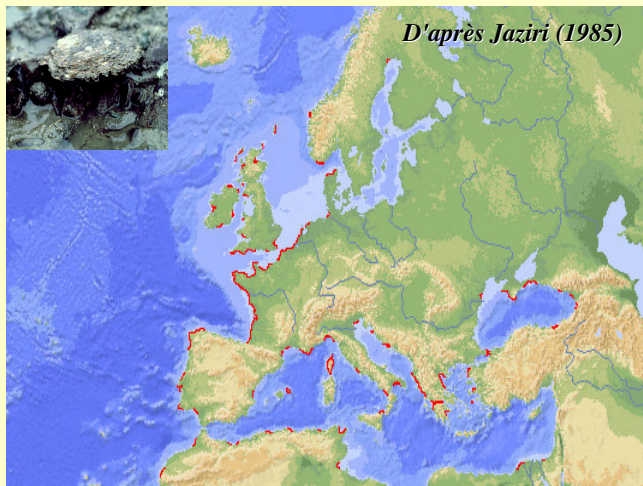
Ifremer



SYSAAF



- The world production of the European flat oyster is only **0.15%** of *Crassostrea gigas* production.
- In France, 1500 t are produced per year, which are about **1 %** of the whole oyster production.
- Anyway, this oyster is a patrimonial species and is important for biodiversity and sustainability of oyster culture



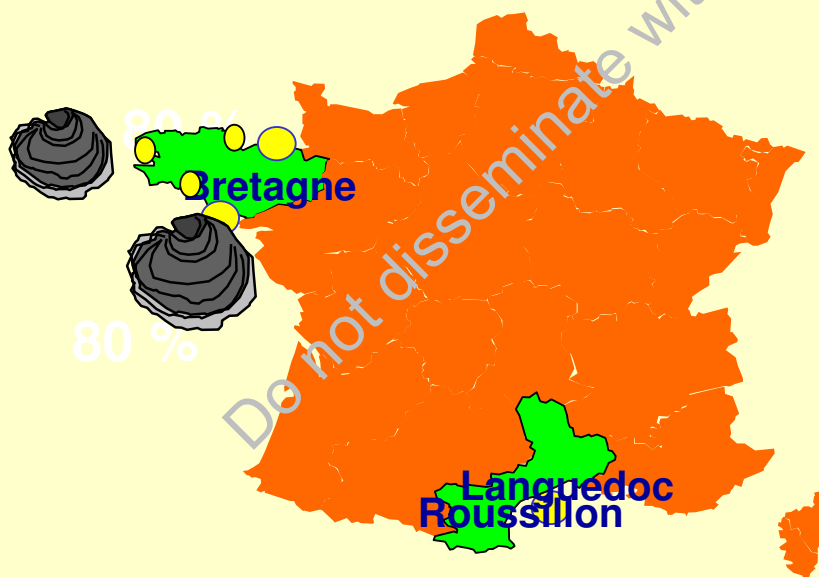
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## *Farming the flat oyster*

Farming of the flat oyster is based on natural spat, collected in Brittany, in Quiberon bay, and Brest).

Hatchery production is limited, due to biological constraints of the species, and to weakness of the spat market.





## *Farming the flat oyster*

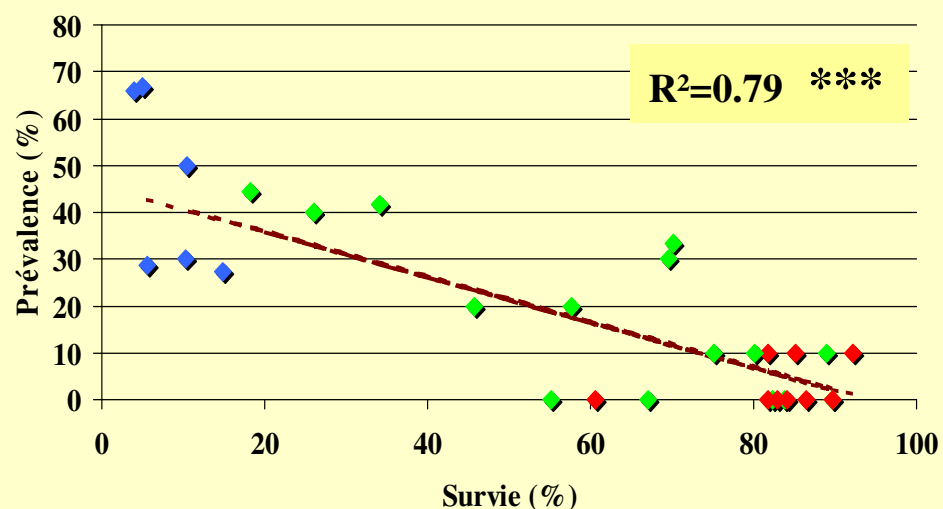
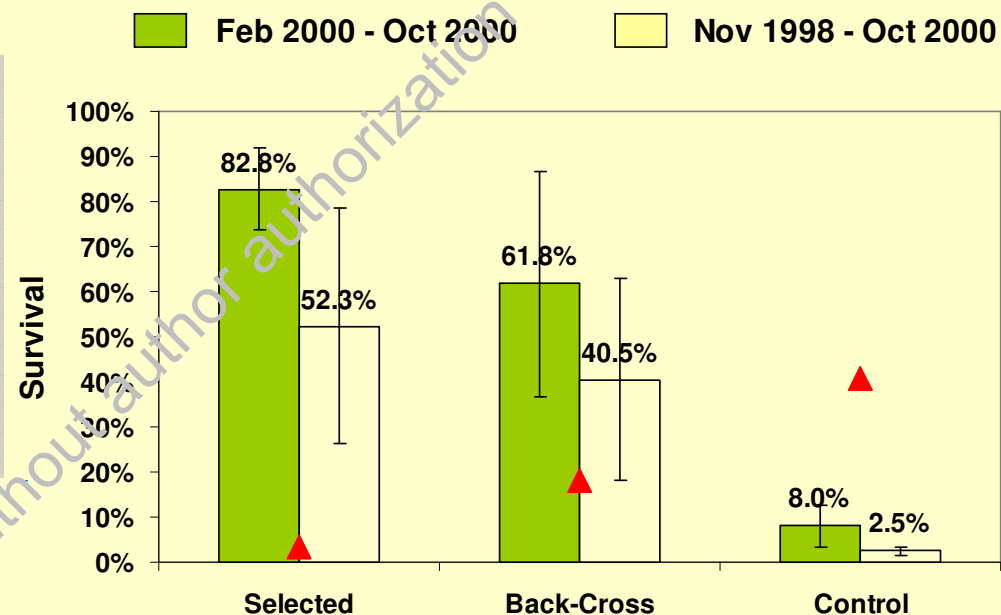
The flat oyster is mainly grown in Brittany, by seeding spat in deep water areas (baie de Quiberon, Cancale)

Culture in deep water prevents *Marteilia* to develop and the density lower than 100/m<sup>2</sup> reduces the losses by *Bonamia*.



# Survival performances of selected strains

- Experimental trials conducted between 1995 and 2000 showed significant increase in survival of selected families
- Survival of families are correlated to *Bonamia* prevalence



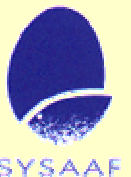
## ***OFISTREA Project (2002-2004)***

- ***Selected families perform better than families from wild breeders in experimental conditions***
- ***But needs :***
  - ❖ ***to confirm these results using professional conditions***
  - ❖ ***to produce large quantities of selected spat in commercial hatchery***



## ***OFISTREA Project (2002-2004)***

- ***The project Ofistrea co-funded by Ofimer was initiated in 2002***
- ***Objectives: (1) to evaluate the technical feasibility of a commercial production of selected flat oyster spat; (2) to validate the experimental data***
- ***The project was conducted between 2002 and 2004***
- ***Partners:***
  - ❖ ***Ifremer***
  - ❖ ***Vendée Naissain (private hatchery)***
  - ❖ ***SYSAAF (Syndicat des Sélectionneurs Avicoles et Aquacoles Français)***
  - ❖ ***SMIDAP (Syndicat Mixte pour le Développement de l'Aquaculture et de la Pêche en Pays de de la Loire)***





# Constraints in the way of production of selected spat

July N

April N+1

June N+1

October N+1

*Wild spat*

Settlement

Seeding

16 months before winter

*Selected spat*

Settlement

Seeding ?

6 months before winter

➤ *Spat settled on mussel shells*

➤ *16m old when seeded*

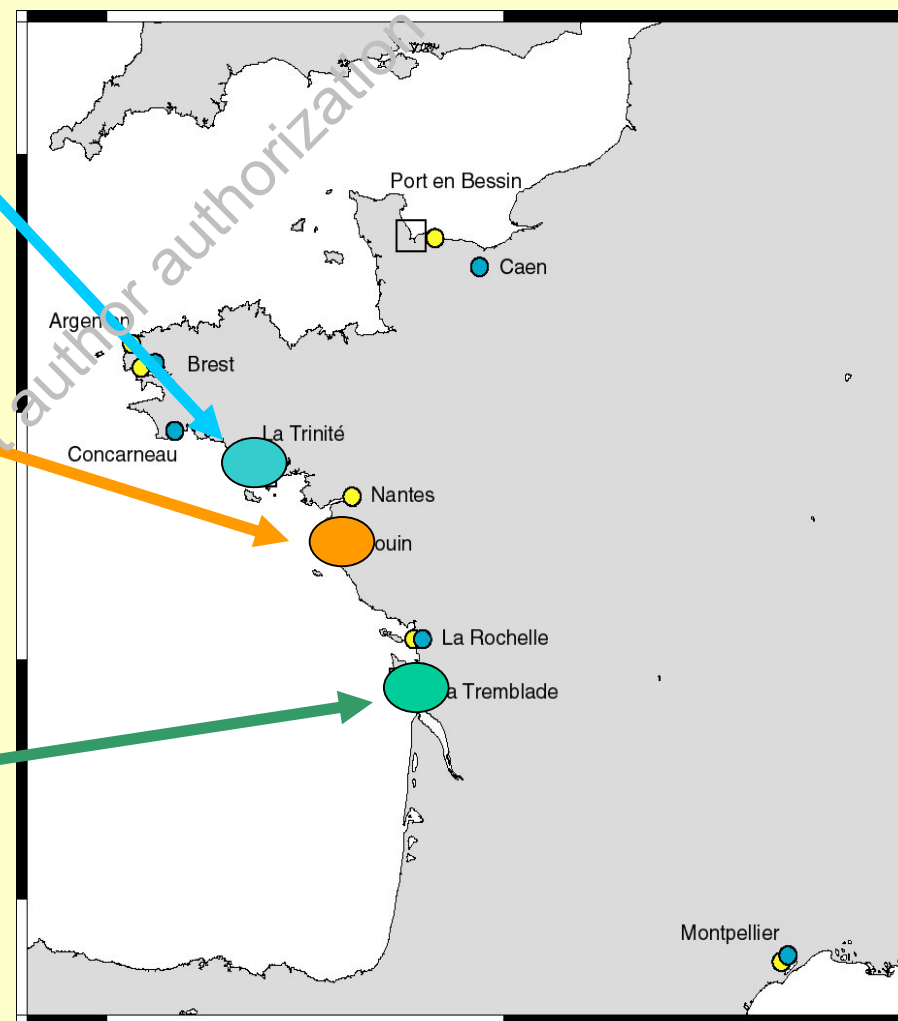
➤ *Spat settled on one by one*

➤ *6m old when seeded ?*

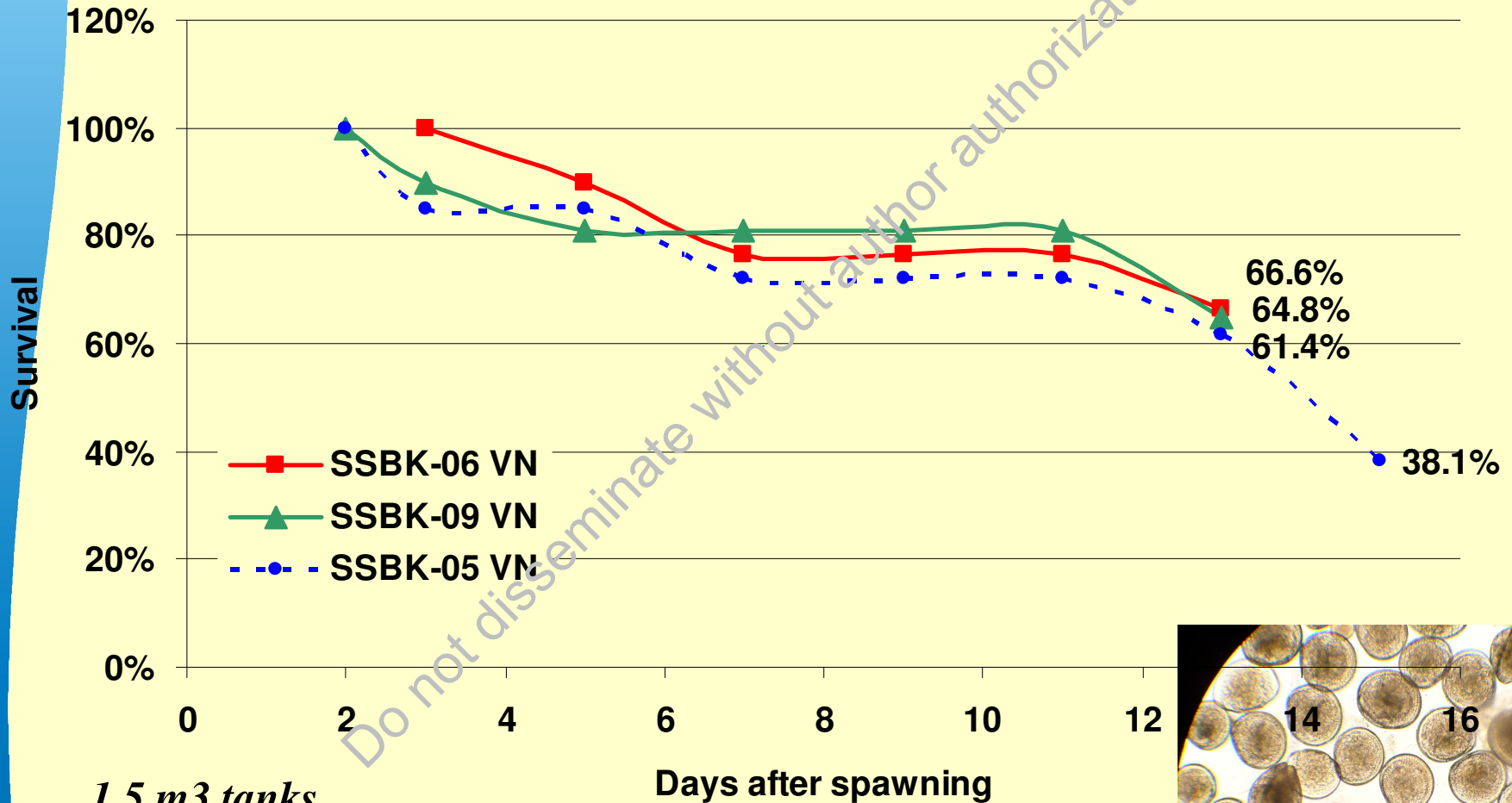
*Pre-grown spat transferred to La Trinite to be wintered then seeded in deep water on the next spring*

*Newly spawned larvae transferred to the Vendee Naissain hatchery in Bouin for larval rearing and first growing*

*Mass spawning of the same breeders than used in experimental trials in Ifremer hatchery in La Tremblade*



# Larval rearing survival of commercial batches

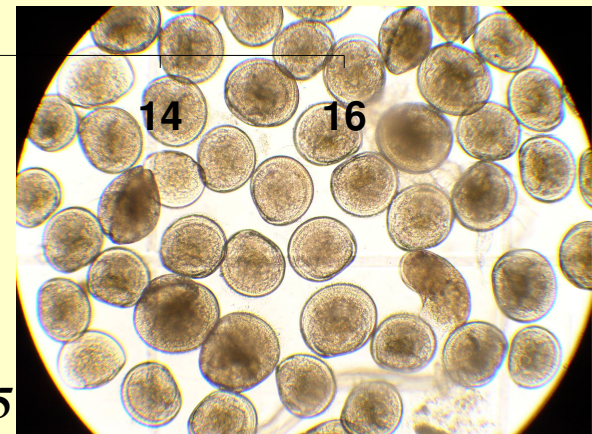


1.5 m<sup>3</sup> tanks

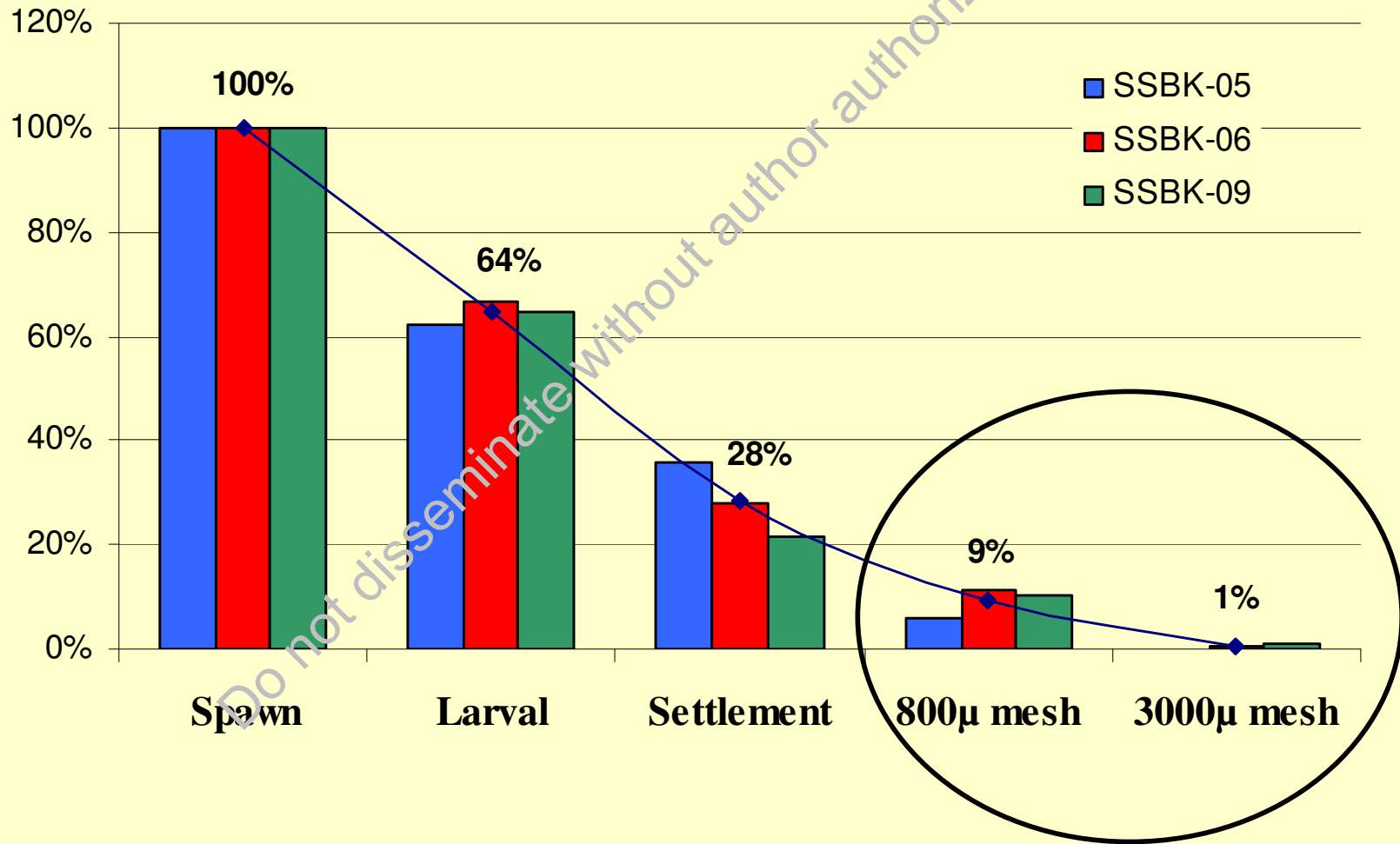
23 °C

Diet : *Skeletonema costatum* + *Isochrysis galbana*

International Conference on Shellfish Restoration 2005



# Global survival of commercial batches



# Diets in larval rearing

- *Isochrysis aff. galbana*
- *Chaetoceros calcitrans*
- *Pavlova lutheri*

## Diet SP

- *Isochrysis aff. galbana*
- *Chaetoceros calcitrans*
- *Pavlova lutheri*

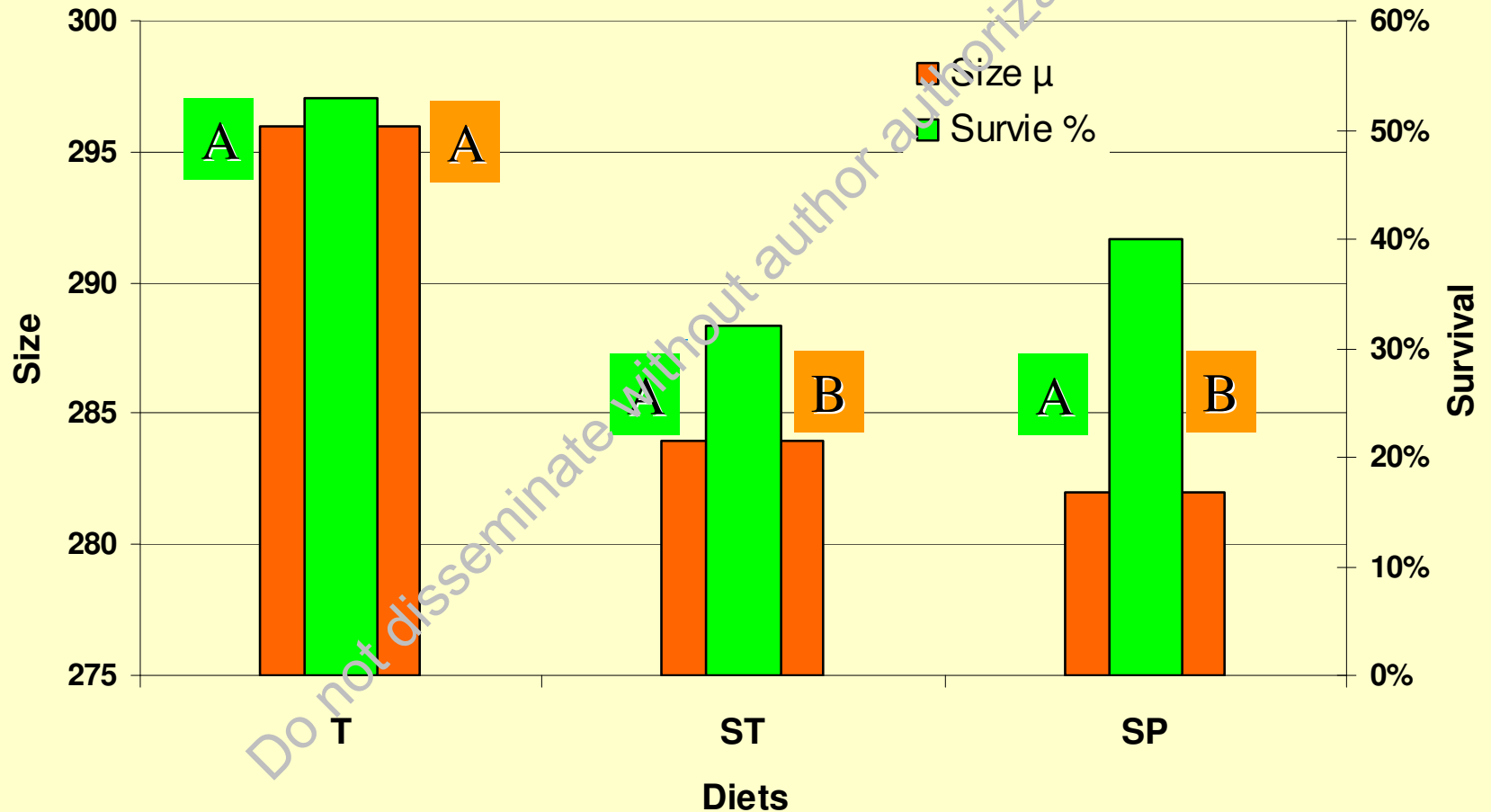
## Diet ST

- *Isochrysis aff. galbana*
- *Chaetoceros calcitrans*
- *Pavlova lutheri*
- *Tetraselmis suecica*

## Diet T

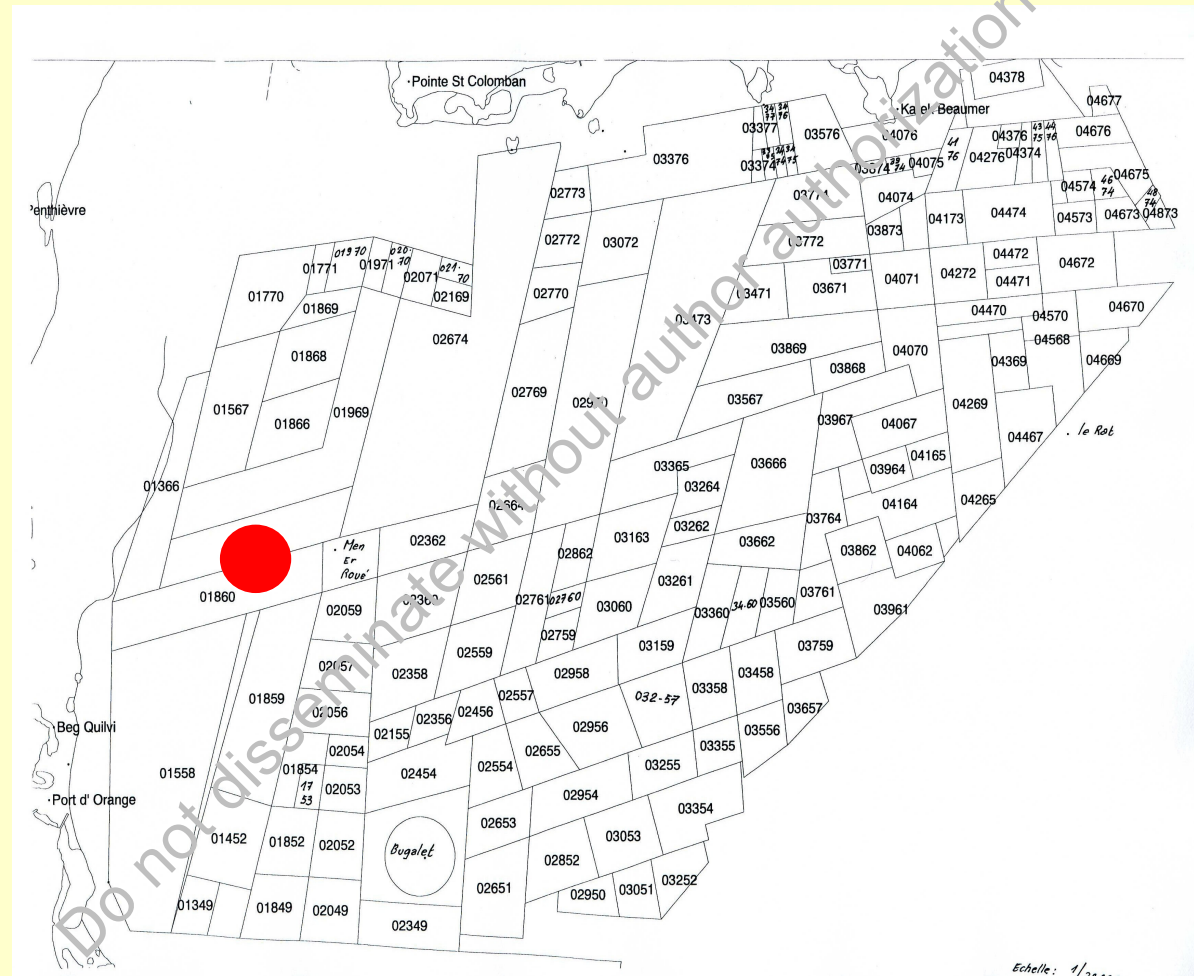


# Diets in larval rearing

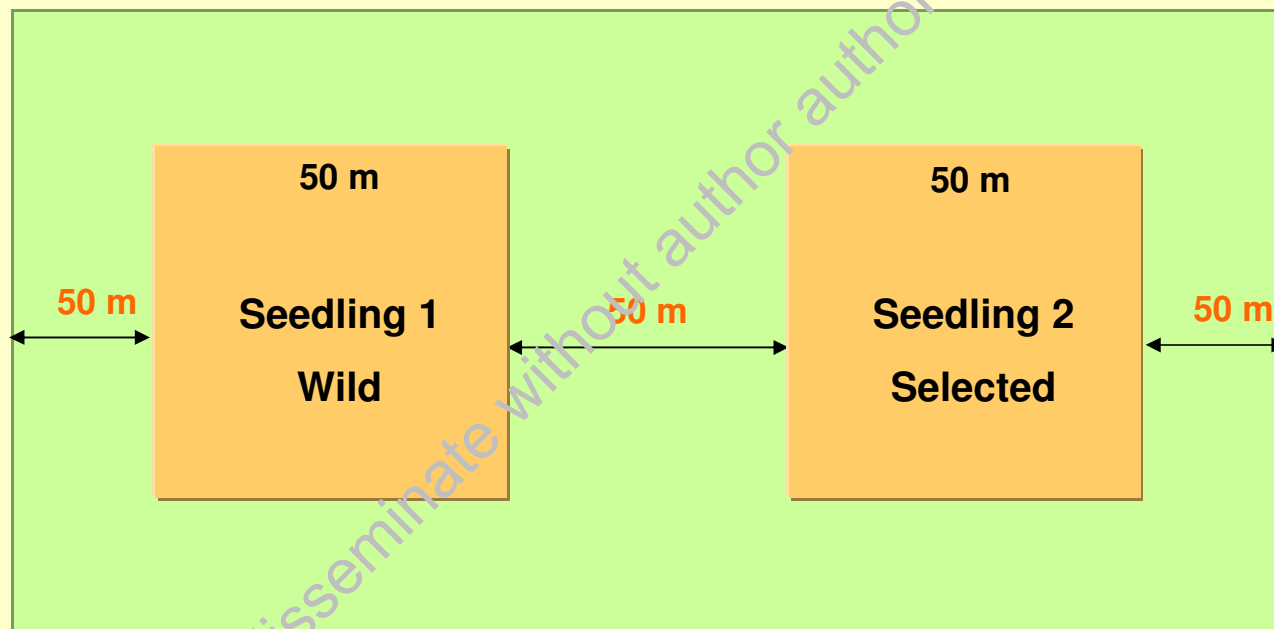


*All data are shown at day 13*

# Spat seeding in bay of Quiberon

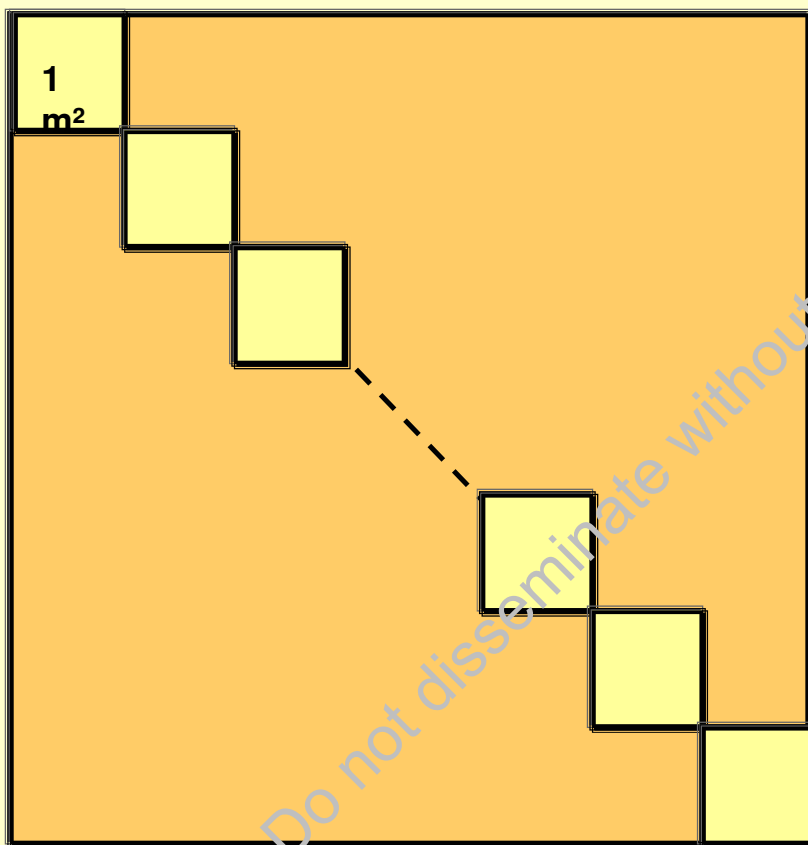


# Spat seeding in bay of Quiberon



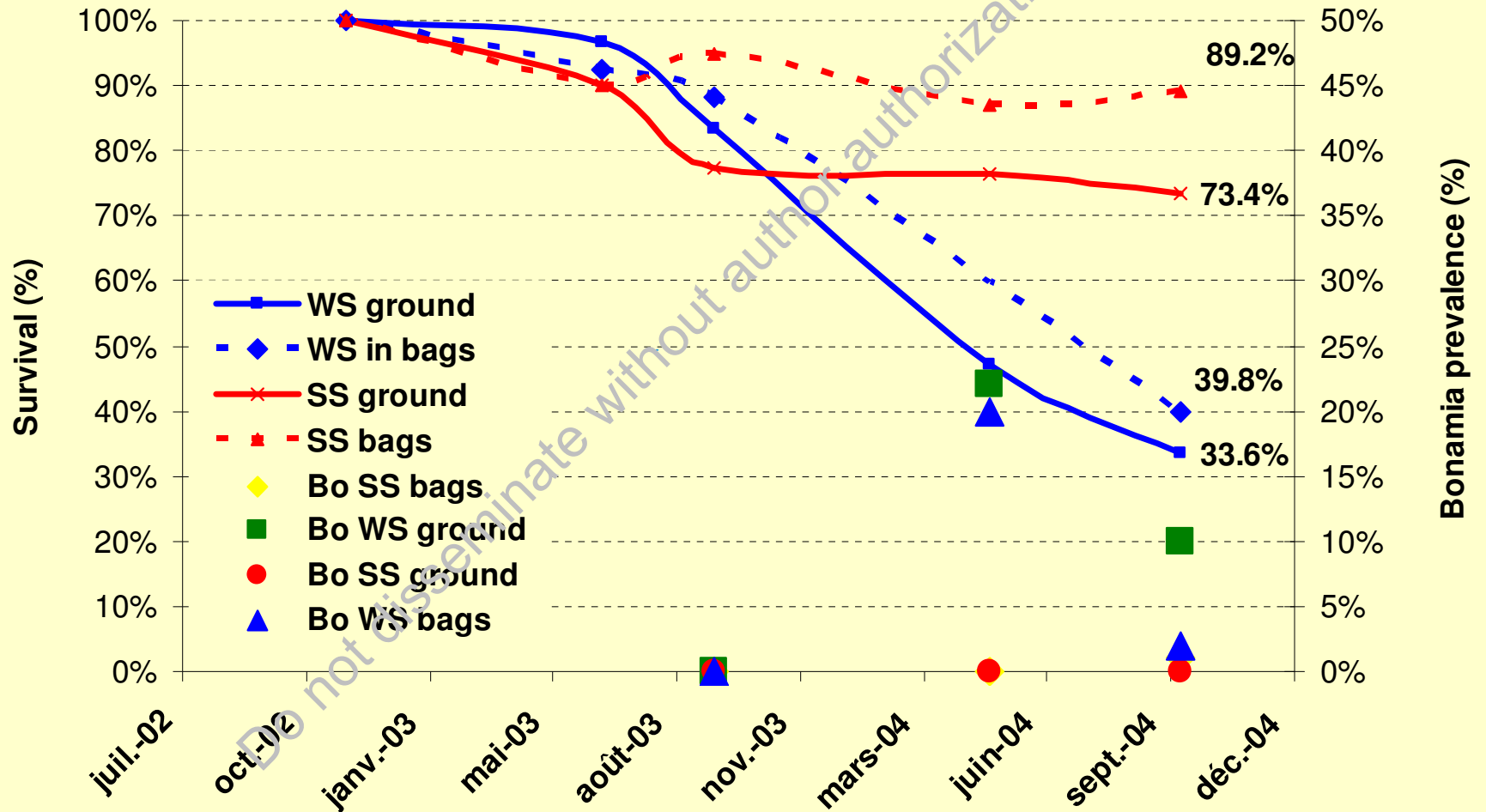


# Spat seeding in bay of Quiberon

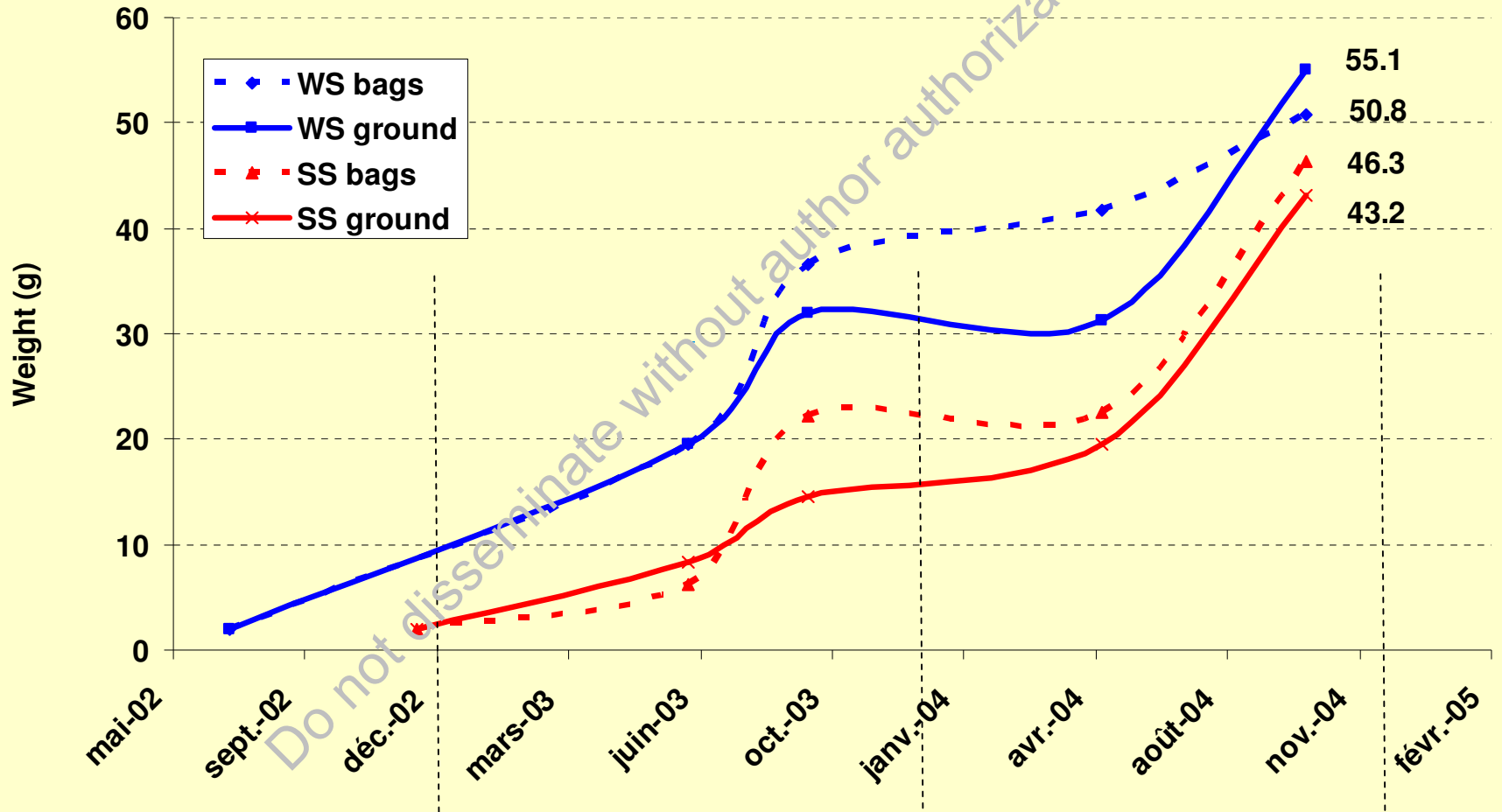


- Seeding of 250 000 wild spat on july 2002 (2500 m<sup>2</sup>)
- First growing of selected spat between july and november 2002 in oyster bags in deep water
- Seeding of 50 000 selected spat on november 2002 (1000 m<sup>2</sup>)
- Control kept in oyster bags

# Performances in bay of Quiberon (Survival and Bonamia prevalence)



# Performances in bay of Quiberon (Weight)



## Conclusions

- *Validation in professional conditions of the response to selection for better tolerance to *Bongamia ostreae**
- *No negative correlated response of growth*
- *Feasibility of mass production of *Ostrea edulis* spat in hatcheries but bottlenecks still remained*
- *No obvious advantage of use of *Tetraselmis suecica* in the larval rearing of the species*
- *Need to arrange the way of production to ensure first growing of hatchery spat before seeding (breeding on deep water long lines or in nursery)*