
REPERE

REPERE

REcherche sur le ***P***étoncle à des fins d'***E***levage et de ***RE***peuplement

***RE*search on *PE*ctinid *RE*stocking**

Georges Cliche et Madeleine Nadeau

Ministère de l'agriculture, des pêcheries et de l'alimentation du Québec

REPERE : Network structure involving 2 levels of government (provincial and federal), the local scallop fishermen association (21 fishermen) and 2 scallop processors

Goal : Develop a profitable technology for the bottom seeding of the Giant scallop (Placopecten magellanicus) in order to rebuilt the scallop beds of the Magdalen Islands, Québec, Canada

Time Frame : 1991-1998

REPERE II : New program put in place in 1999 involving the same partners plus producers of other regions (Gaspésie and North Coast)

Goal : 1.-Main goal is still to develop a profitable technology for the bottom seeding of the Giant scallop (Placopecten magellanicus) in Magdalen Islands

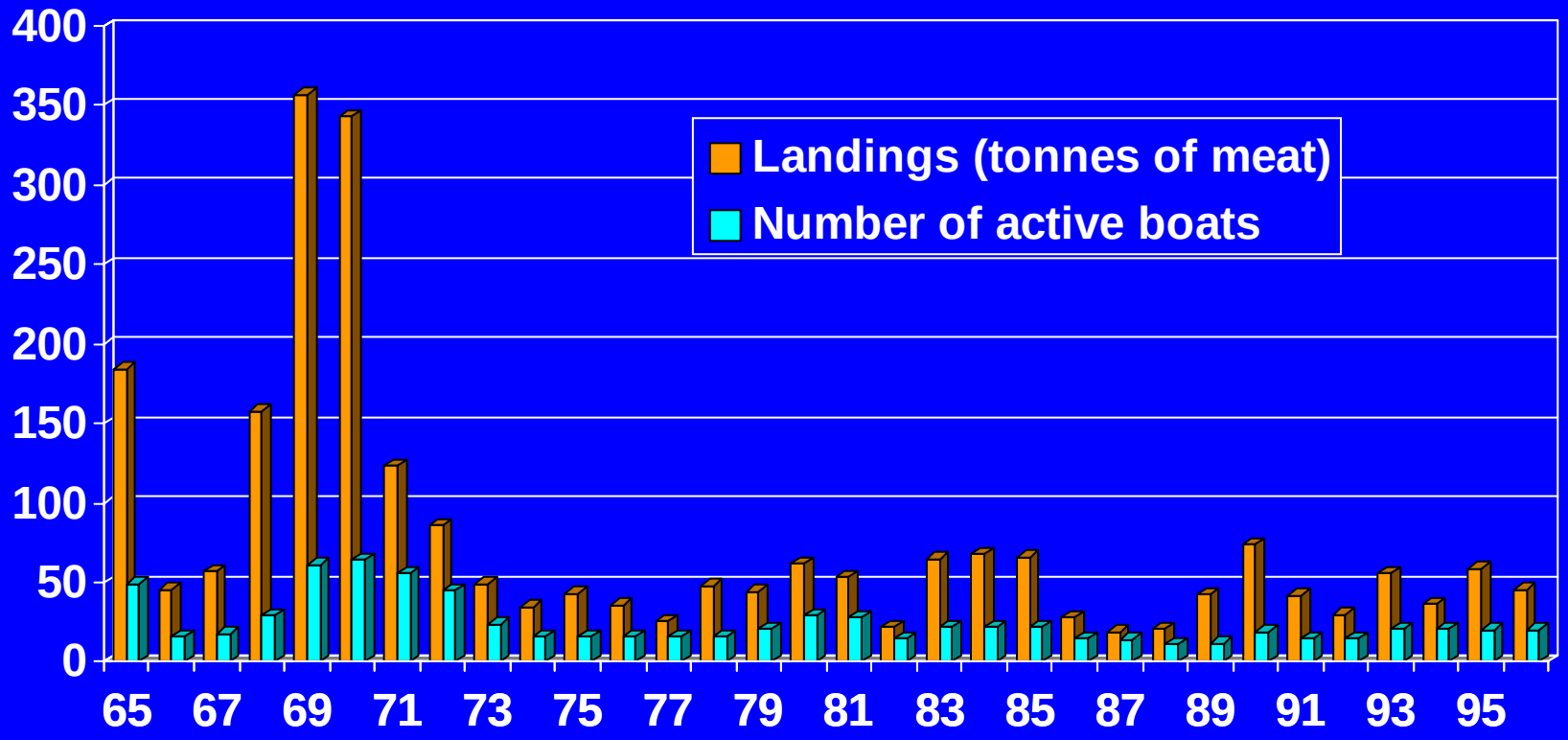
2.- New goal is to evaluate potentiel of suspension culture and bottom seeding in other régions of Québec

Time Frame : 1999 –until now

Evolution of the fishery in Magdalen Islands

Scallop landings and fishing effort from 1965 to 1996

Drop in landings and persistent bad shape of natural population lead to choose aquaculture approach in 1990 to restore scallop stocks



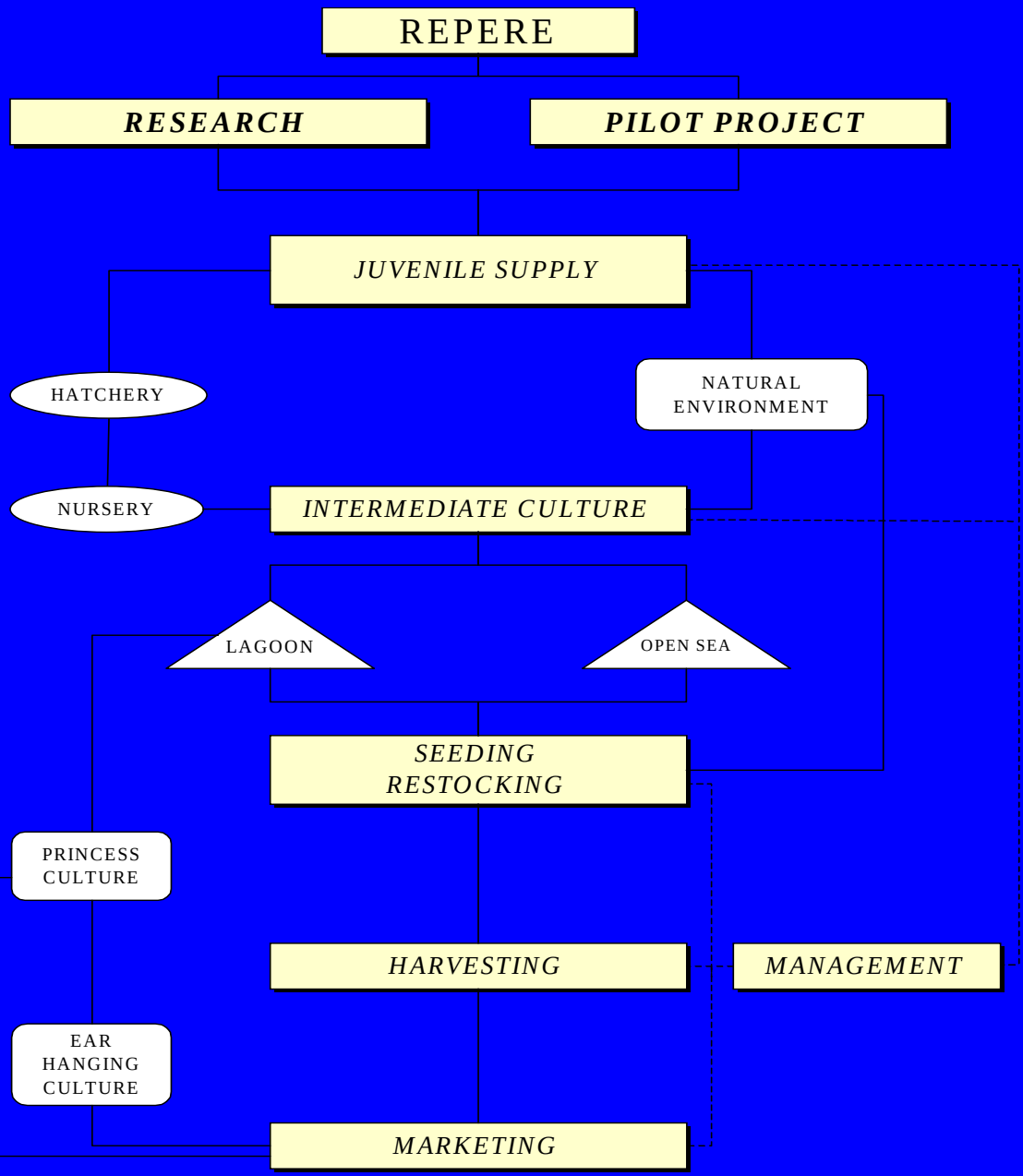
Financial feasibility study

- Bottom seeding appears profitable under certain conditions.
- Up-date of the study every year between 1994 and 1997
- Technological improvements and manpower increasing expertise help to reduce production costs and to precise production scenario bringing financial profitability on long term projection

Programming

- Financial feasibility study
- Juvenile supply for seeding purposes
- Seeding and harvest
- Commercial technology and pilot project
- Annual transfer of technology meeting
- Reports

SUMMARY OF THE PROGRAM AND ITS COMPONENTS



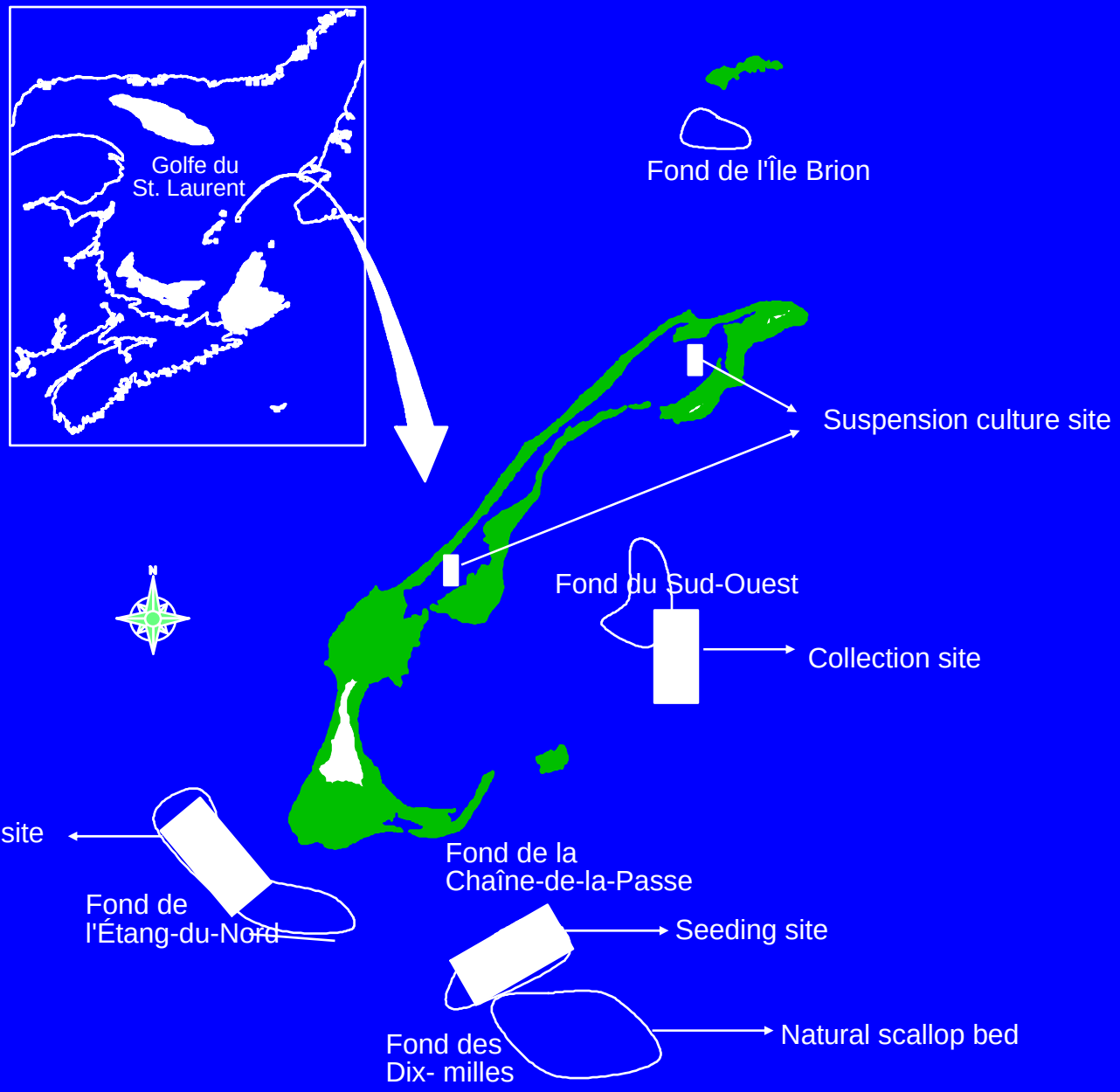
R&D effort associated to the program

- Important program of R&D has been put in place in 1990 by provincial and federal government to characterize biological parameters related to spat collection, intermediate culture, seeding operations and to help to find solutions to technical problems
- Very close association of scientific team and producers has helped to orientate R&D works on the main problems of the industry.
- Annual meeting has permitted to transfer rapidly experimental results to the industry and to identify research priorities year after year.

Bottom seeding pilot project associated to REPERE

- Pilot project started in 1992 by fishermen Association to do transfer and integration of « know – how » obtained at experimental scale
- Pilot project has permitted to avoid important financial losses related to lack of technical expertise and to develop progressively expertise for large scale operations
- Financial support of government has been very important during the first five years
- Pilot project has permitted to the fishermen to evaluate the potential of seeding operations

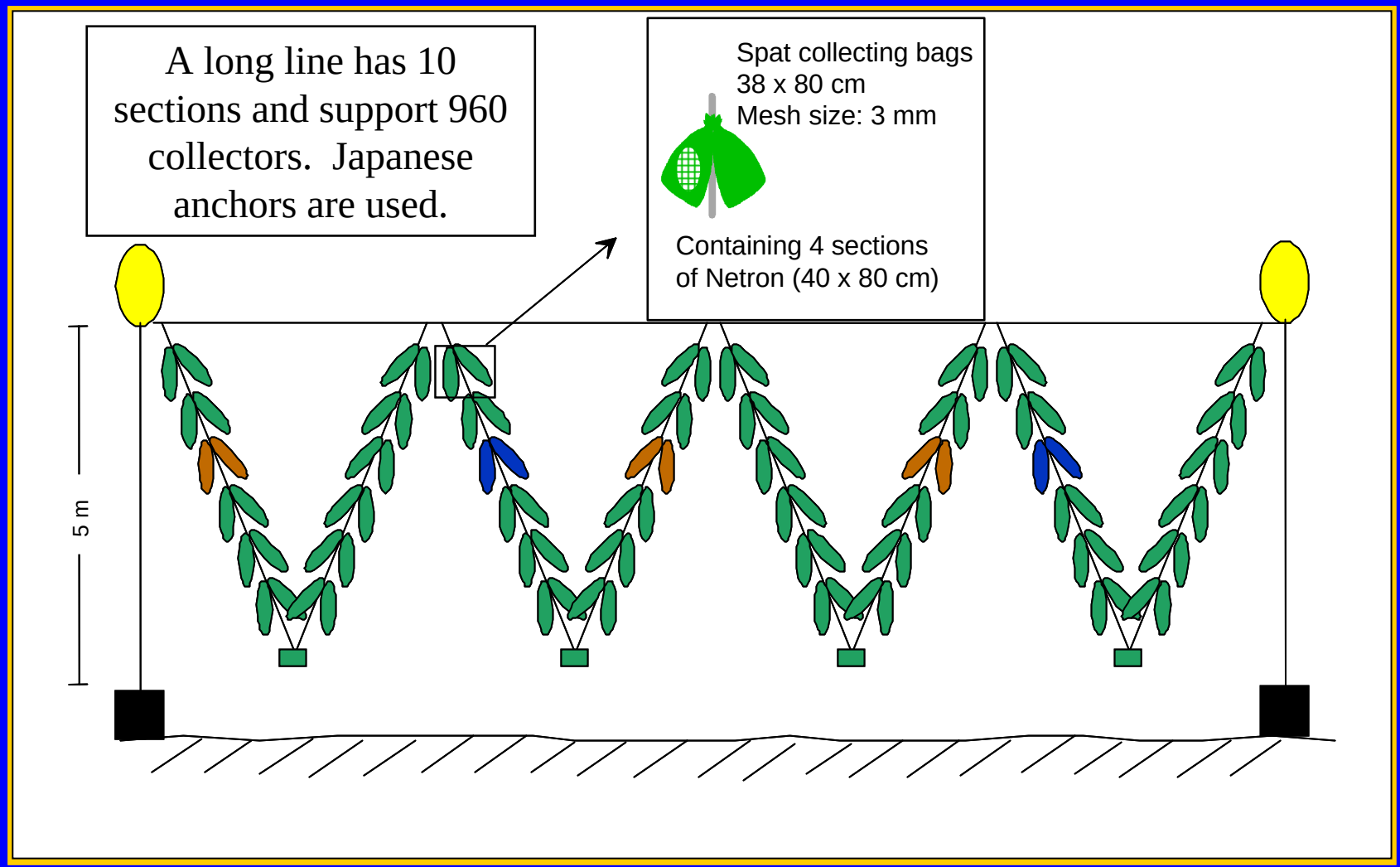
LOCATION OF DIFFERENT SITES ASSOCIATED TO REPERE PROGRAM AND COMMERCIAL OPERATIONS



Juvenile supply for seeding purposes

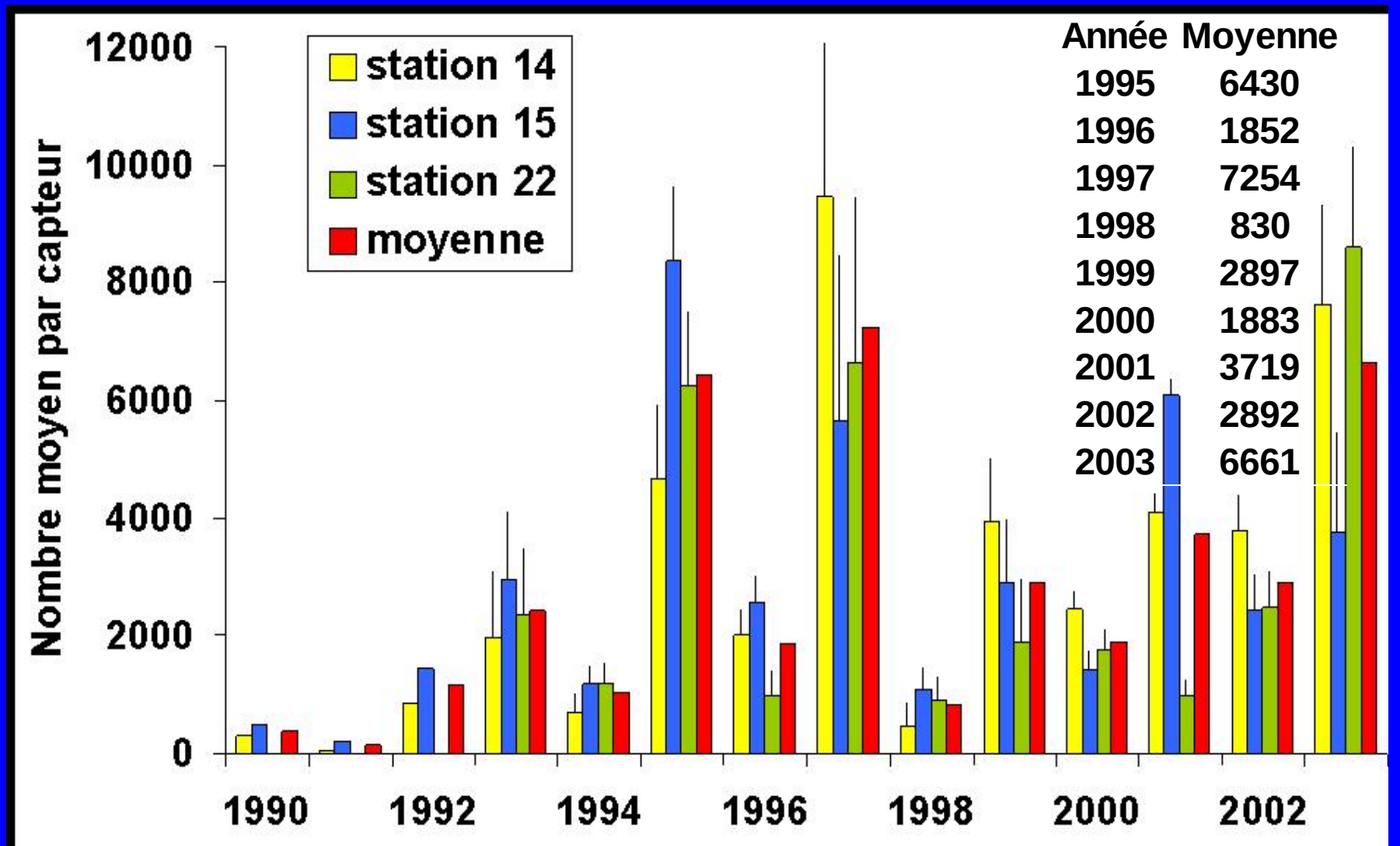
- Rather discouraging results with hatchery-nursery trials in the Magdalen Islands (1990)
- On Lower North Coast, important efforts to develop commercial size operations in hatchery-nursery with good results
- Encouraging results with natural spat collection in early 90 in Magdalen Islands
- Natural spat collection choosen to supply spat for seeding in Magdalen Islands
- Presently, company Pétoncles 2000 immersed 60 000 collectors on two collecting sites

Section of long line with collectors

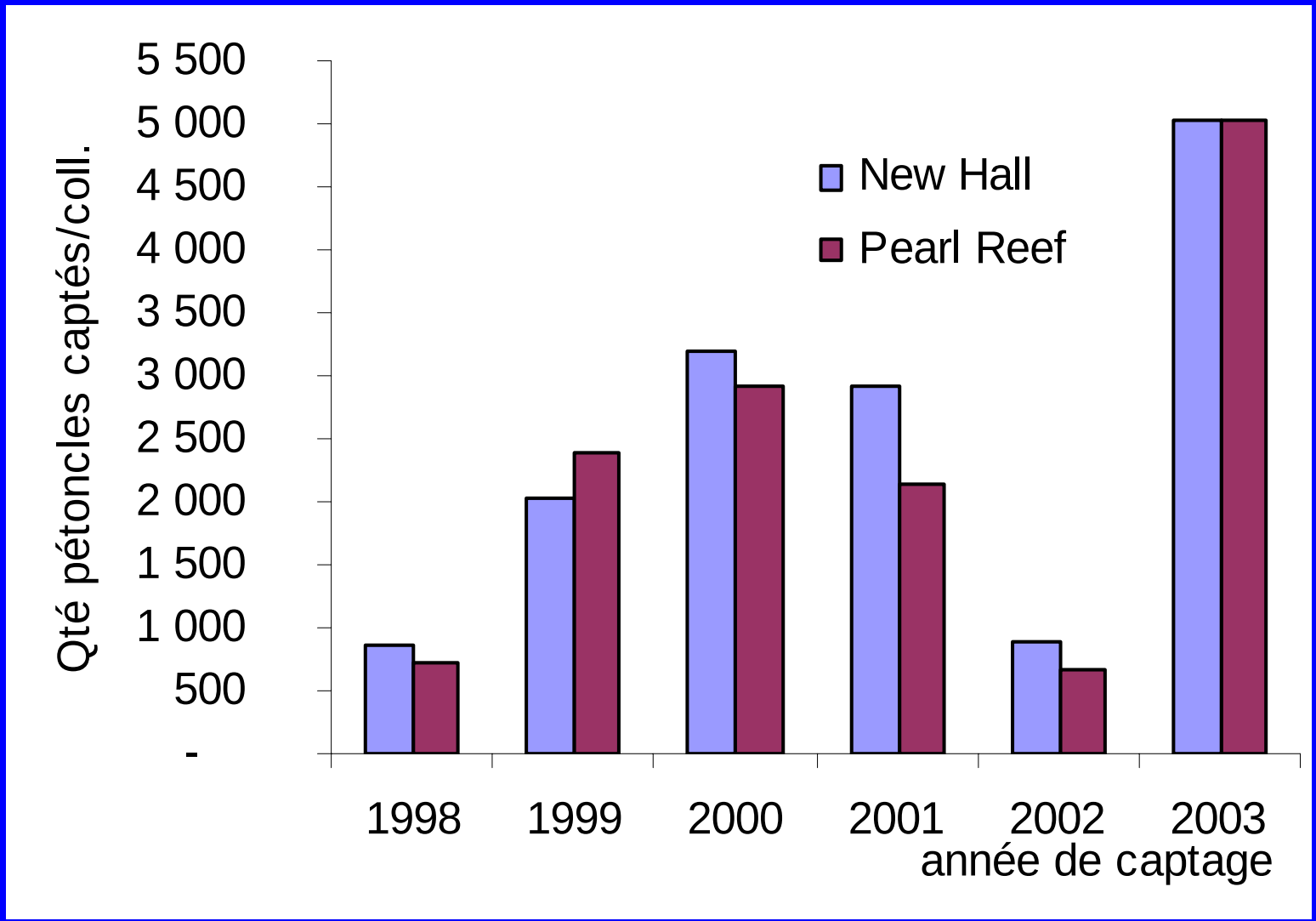


Juvenile supply for seeding purposes

Natural spat collection on experimental stations located near the commercial collection sites



Scallop spat collecting on « Pétoncles 2000 » sites from1996 to 2003



Seeding size and time
2 scenarios

Collecting, intermediate culture and seeding operations

~12 months in collectors +

~ 6 - 8 months in pearl nets in the lagoons

35-45 mm

Seeding in the spring

Bottom opened to commercial fishery 4 years later

Scenario presently used up to 35 millions

Grow-out

~12 months in collectors

15-25 mm

Seeding in the fall

Bottom opened to commercial fishery 5 years later

Scenario used for scallops over 35 millions

Intermediate culture equipment

- Franken SCS-1TM scallop spat sorter (new system presently tested)
- 300 000 square pearl nets (35 x 35 cm and 4,5 mm mesh size)
- 450 long lines in Havre-aux-Maisons lagoon
- Pearl net and collector Japanese washing machine
- 9 meters catamaran for operations in lagoon
- Scallop fishing boat with star wheels for open sea operations (spat collection and seeding operation)

Objectives of Pétoncles 2000

- To deal with the 70% losses during the year spat stay on collectors, Pétoncles 2000 aimed to collect annually 100 to 125 millions juveniles
- Presently, Pétoncles 2000 immersed 60 000 collectors on two collecting sites
- Pétoncles 2000 needs to have 120 long lines on collection sites to support 2 series of collectors in same time (collectors spend 1 year in water before cleaning)
- Recuperation rate after one year is presently around 30% but the objective is to recuperate around 50%
- Pétoncles 2000 aims to get annually from collectors (1 year after immersion) around 40 millions scallops for intermediate culture operations in lagoon and to seed annually 30 to 35 millions scallops of 30-40 mm

Seedings: Evaluation of survival, dispersion and growth

- 1993 to 2000 seedings: Proportion of scallops seeded are tagged
- Under-water camera mounted on a support is used to assess scallop survival and predators abundance
- Experimental dredging with double netting also used for abundance assessment
- Sampling by observers on boats during fishing operations on seeded beds
- Commercial fishing every year on one opened seeded site (5 sites seeded and opened in rotation)

Survival, dispersal and growth

- Experimental seedings: rapid dispersal (85 to 99 %) after few months especially for fall seeding (s)
- Survival of 33 to 50 % after few months during surveys on experimental seedings
- Example: 1996 survey (120 days after seeding) gave: 45 % of seeded scallops found on the site. Of those 49% survivors
- Growth rate on seeded beds is around 18 mm/year
- On seeded sites opened to commercial fishery, catching rates of seeded scallops estimated between 10 and 20 %
- Catching rates need to be improve to reach 20 to 30 %

Predation

- Important predation on scallops seeded
- 3 species of starfish: *Asterias vulgaris*, *Leptasterias polaris* and *Crossaster papposus*
- 2 species of Crab: *Cancer irroratus* (rock crab) and *Hyas* sp.
- Better control of predation is required to improve catching rates
- 2003-2006: Studies on predatory behaviour: abundance, densities variation, feeding variation with tethered scallops

Vitality

- Tools development to evaluate the scallops vitality during seeding

Seeding modelization

Financial structure

- « Pétoncles 2000 » is a company owned by Scallop Fishermen Association (51%) and private investments
- Pétoncles 2000 has to realize collecting operations, intermediate culture in lagoon, seeding operations, stock assessment on seeded bottoms, distribution of quotas to scallop fishermen and to prepare fishing plan and control the landings
- Pétoncles 2000 employ 30 seasonal workers for period going from 4 to 7 months a year
- Quota of each fisherman is related to his share in the company
- For each kilo of scallop fished, fisherman has to pay around 30 % of the value of his landing to Pétoncles 2000

Operations management

- 21 of the 23 scallop fishermen are participants in Pétoncles 2000
- Pétoncles 2000 own leases for collecting, intermediate culture and seeding sites and the company is responsible for the management of the fishery on the seeding sites
- Fishermen have accepted an important reduction of their fishing sites and the two fishermen non-participants cannot fish on the sites of Pétoncles 2000
- Before to open a site to the fishery, Pétoncles 2000 assess the volume of scallop available and establish a global quota
- In collaboration with fishermen, fishing plan is established to decide the number of days and hours the fishermen are allowed to fish
- When the global quota is caught, if landings are still good, a new quota can be allowed

Main problems remaining

- Recuperation rates of scallops on collectors cleaned 1 year after immersion have to be improved to increase number of scallops seeded (important effort of R&D directed on that problematic with interesting results)
- Catching rate has also to be improved to reach more than 20% of scallops seeded to reach commercial profitability (control of predation is the key factor and R&D projects are presently realized to search solution)
- Difficulties to find financing because important delay before to have a return on investment

Conclusion

- Scallop culture is a new sector of aquaculture activities still fragile because more expertise is needed and there are still biological, technical and financial unknowns
- Financial support of government has been important and is still required to support the industry
- Important to prove rapidly financial profitability to secure actual producers and investors and attract new ones
- Structured R&D is essential to help the industry to find solutions to remaining biological and technical problems