Resettlement of young freshwater pearl mussels in Brittany (France)

Pasco P.-Y., Capoulade M., Blaize C. & Dury P.

Bretagne Vivante sepnb

Une voix pour la nature

FEDE PECHE 29

Fédération du Finistère pour la Pêche et la Protection du Milieu Aquatique



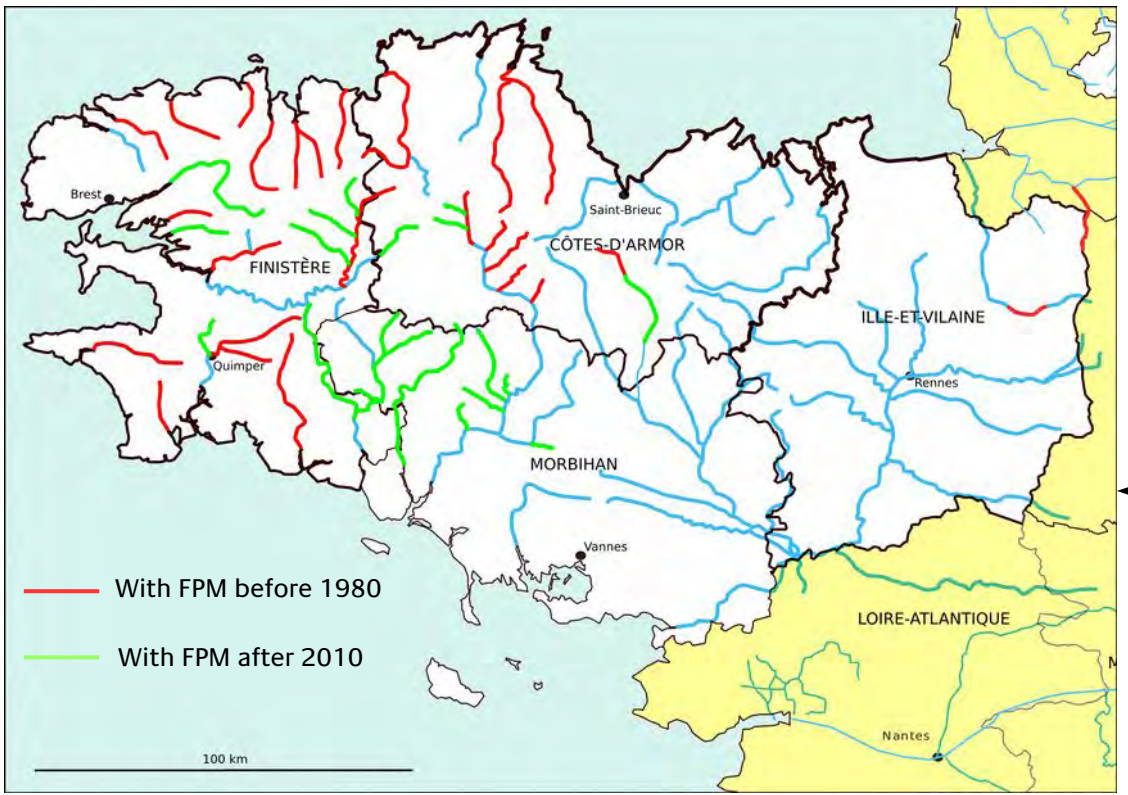
Dresde, Germany
27 th March 2019

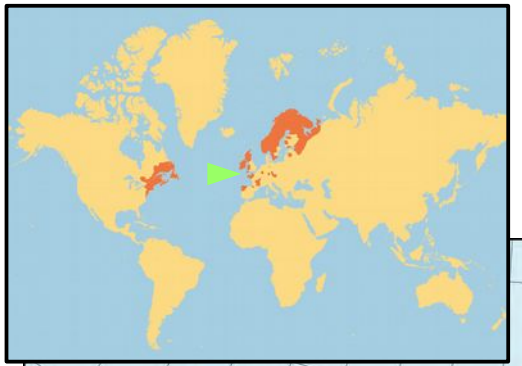
UNION EUROPÉENNE
UNANIEZH EUROPA

L'Europe s'engage en Bretagne / Avec le Fonds européen de développement régional

Freshwater pearl mussel in Brittany (France)

→ decline of 90 % in 50 years
→ total population : 10 000 – 15 000 individuals



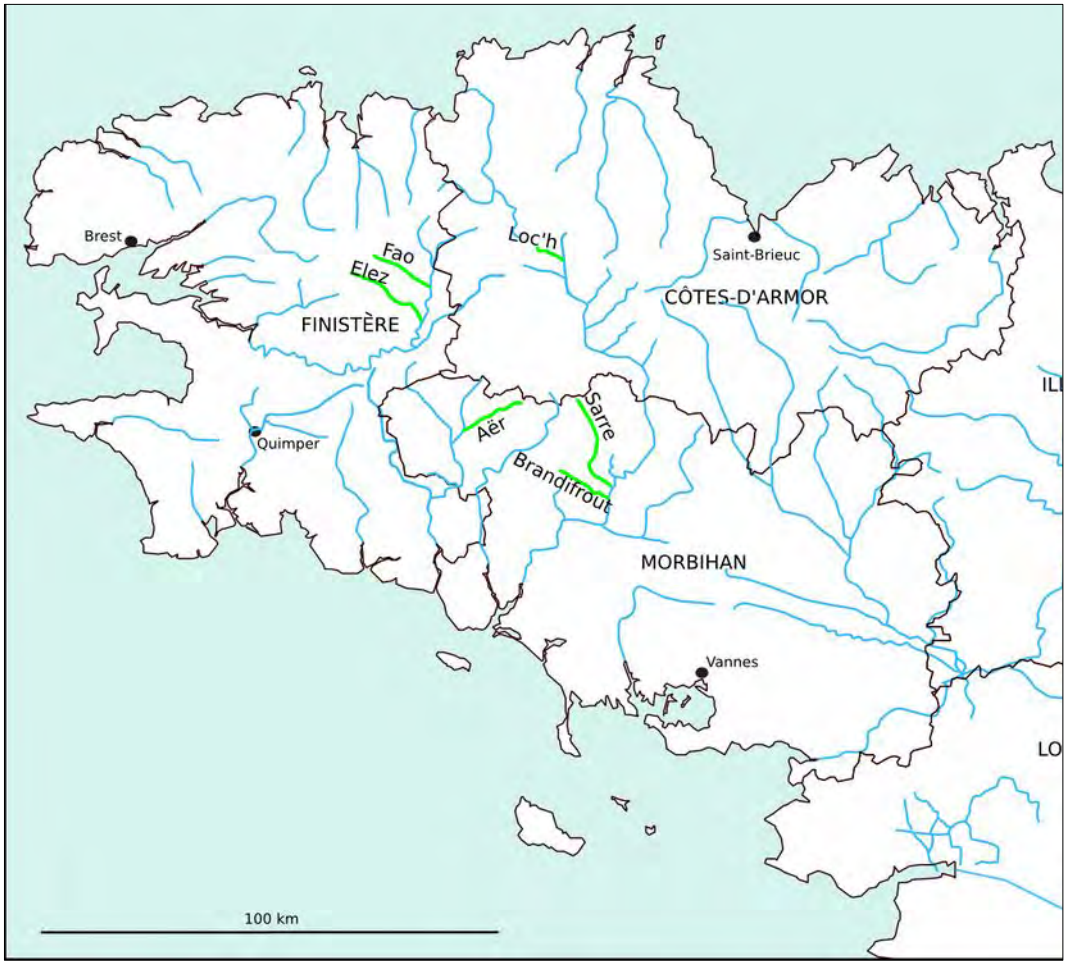




Beaume *et al.*, 2016. Freshwater Pearl Mussel Conservation in the Rivers of Brittany and Normandy: LIFE+ Nature «Freshwater Pearl Mussel Conservation in the Armorican Massif» Programme Report, 2010–2016

Distribution of freshwater pearl mussel in Brittany (October 2018)

Only 7 rivers > 100 ind.



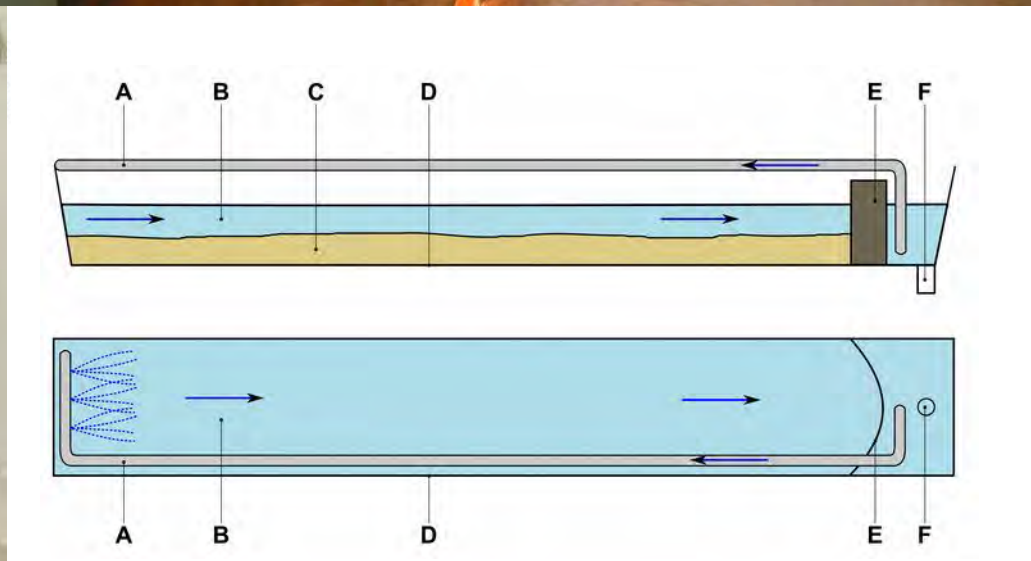
FEDE PECHE 29

Fédération du Finistère pour la Pêche et la Protection du Milieu Aquatique









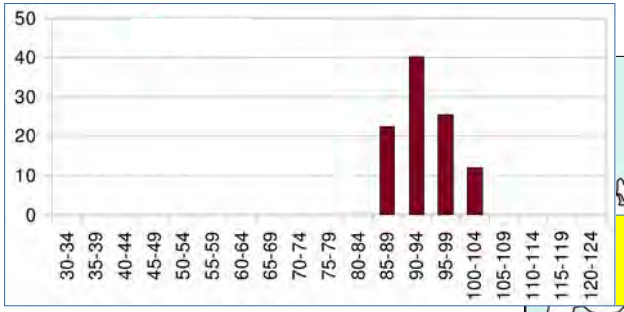
FEDE PECHE 29

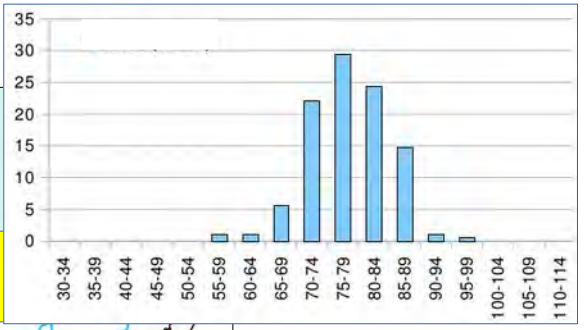
Fédération du Finistère pour la Pêche et la Protection du Milieu Aquatique



Distribution of freshwater pearl mussel in Brittany (October 2018)

Only 7 rivers > 100 ind.



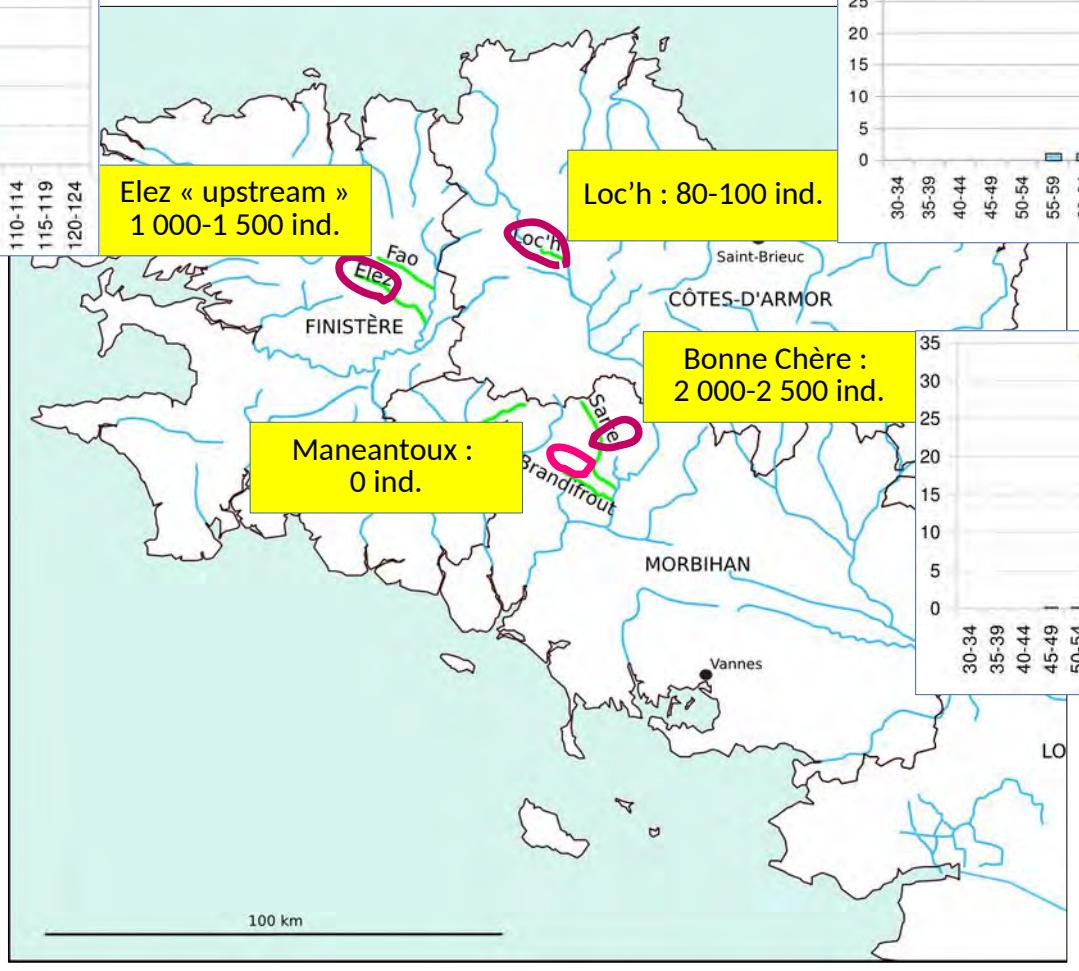


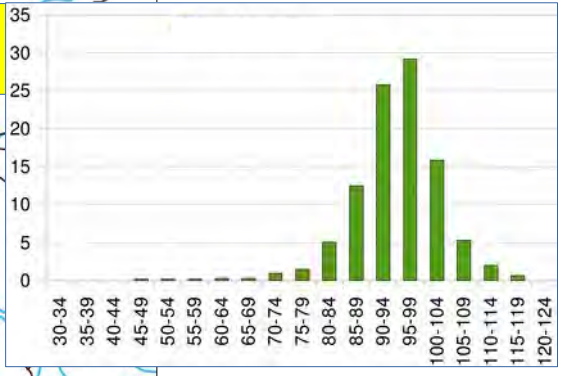
Elez « upstream »
1 000-1 500 ind.

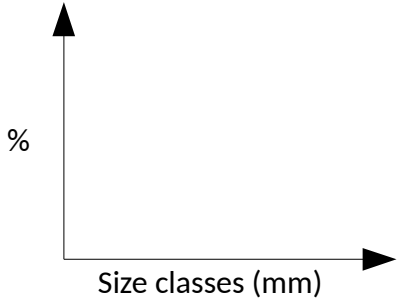
Loc'h : 80-100 ind.

Bonne Chère :
2 000-2 500 ind.

Maneantoux :
0 ind.





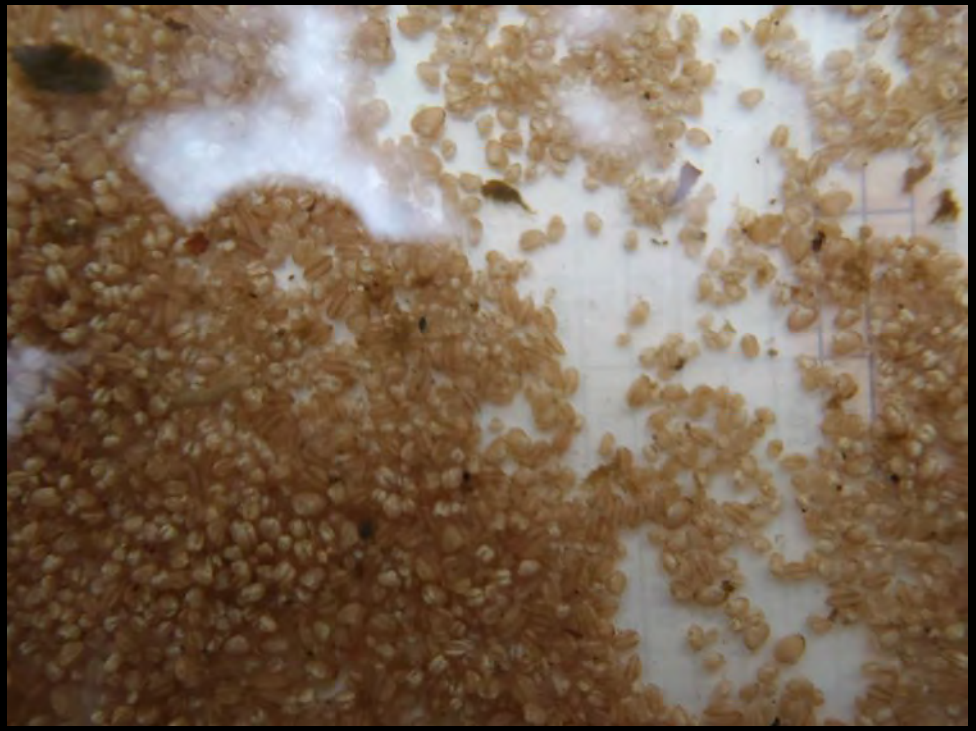


Juveniles at the breeding station of Brasparts
(November 2018)

Cohort (year of excystement at the breeding station)	Bonne Chère	Elez	Loc'h
0+ (2018)	-	-	-
1+ (2017)	x 1 000	-	x 1 000
2+ (2016)	x 1 000	-	x 1 000
3+ (2015)	5 000	-	-
4+ (2014)	--	1 750	850
5+ (2013)	2 350	1 000	395
6+ (2012)	-	800	-





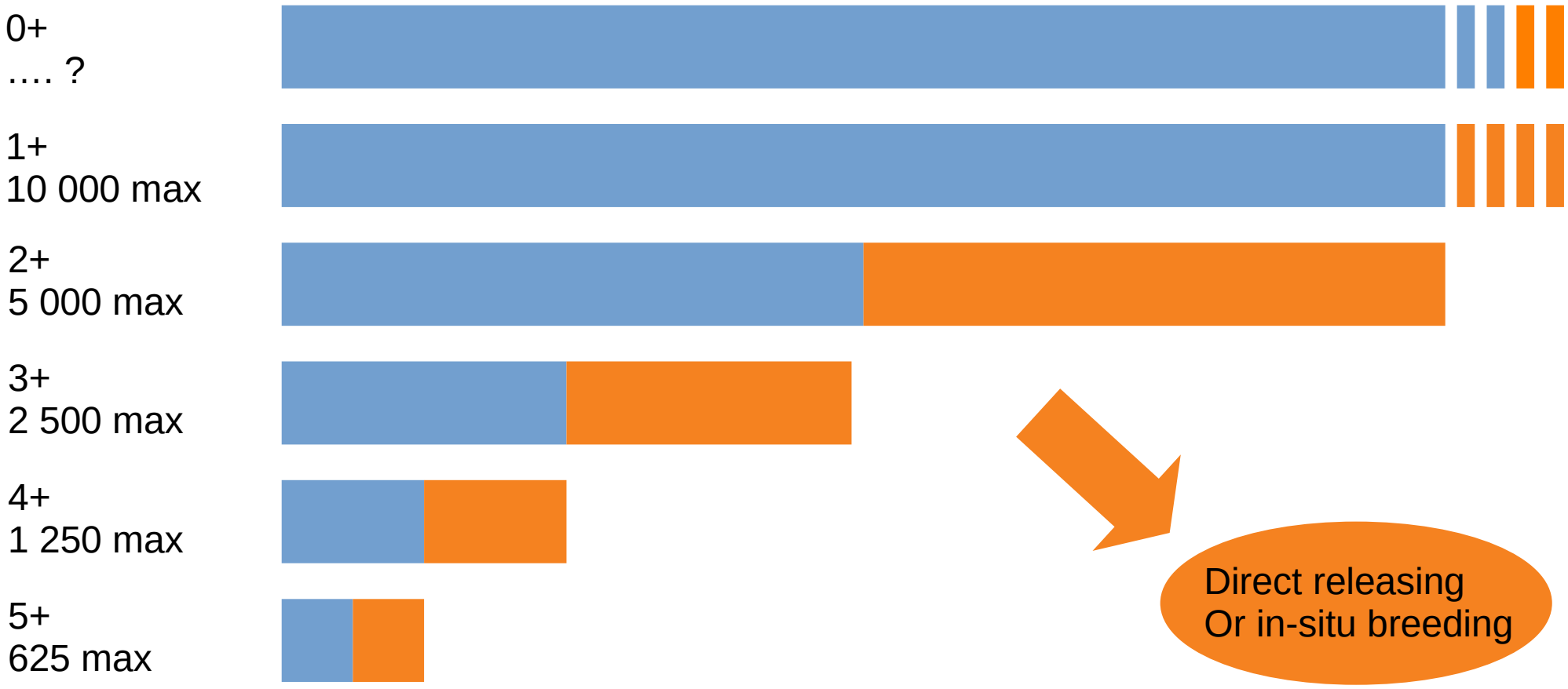





5 mm

Max kept at the breeding station

In theory : max 6 cohorts per population at the breeding station, 6 pop max



Direct reinforcements

Juveniles

Cohort 0+	> 5 millions
Cohort 1+	180 000
Cohort 2+	14 000
Cohort 3+	6 000
Cohort 4+	200

Infestation of local brown trouts

Elez	32
Bonne Chère	321
Loc'h	30

Releasing of infested brown trouts

Elez	5 500

Elez : reinforcements

	2012	2013	2014	2015	2016	2017	TOTAL
Cohort 0+	5 millions	28 000	45 000				> 5 millions
Cohort 1+		400	145 000	2600			~ 150 000
Cohort 2+				4 000			4 000
Cohort 3+					1 500	3 600	~ 5 000
Cohort 4+					200		200

Loc'h : reinforcements

	2012	2013	2014	2015	2016	2017	TOTAL
Cohort 0+	1 000	1 000					2 000
Cohort 1+							
Cohort 2+							
Cohort 3+					1 000		1 000
Cohort 4+							

Maneantoux : reintroductions

	2012	2013	2014	2015	2016	2017	TOTAL
Cohort 0+		15 000	30 000				45 000
Cohort 1+			30 000	4 200			34 200
Cohort 2+				3 500	6 000		~ 10 000
Cohort 3+							
Cohort 4+							







Resettlement done in favourable places found with our mesh tube experience









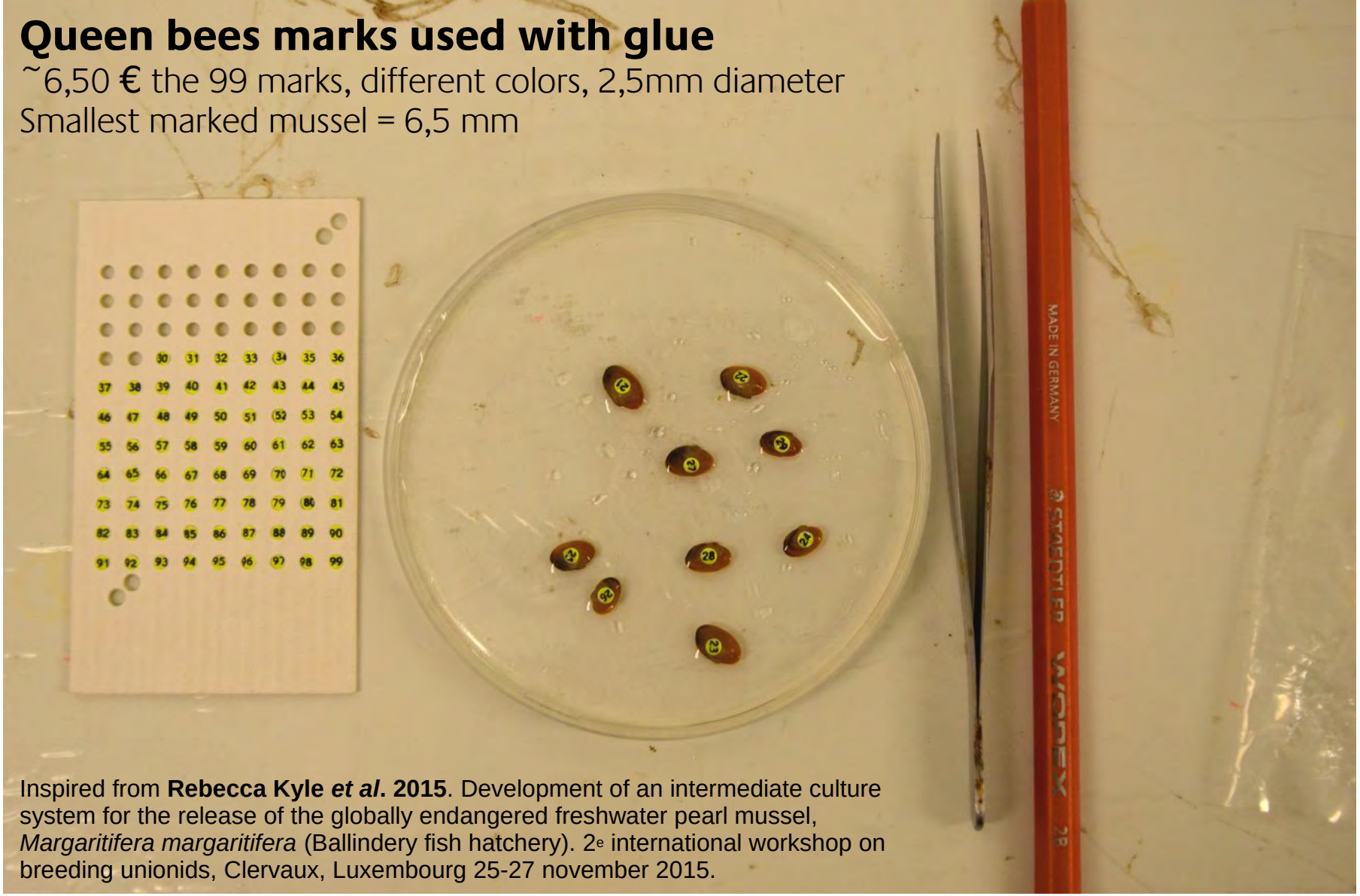




Queen bees marks used with glue

~6,50 € the 99 marks, different colors, 2,5mm diameter

Smallest marked mussel = 6,5 mm



Inspired from **Rebecca Kyle *et al*. 2015**. Development of an intermediate culture system for the release of the globally endangered freshwater pearl mussel, *Margaritifera margaritifera* (Ballindery fish hatchery). 2e international workshop on breeding unionids, Clervaux, Luxembourg 25-27 november 2015.

Plastic boxes with sediments

10 boxes settled since 2015. Survival > 50 %







Elez

100 Marked in april 2016 (4 years / 8-9 mm)
In sept. 2016 : in a box
Controled in nov. 2018 : 2 mussels (n°84 and 70)

n°70 : 8,14 to 14,41 mm

n°84 : 9,15 to 11,22 mm







Elez

100 Marked in april 2016.
In sept. 2016 : a box with 100 mussels (4 years / 8-9 mm)
Controled in nov. 2018 : 2 mussels (n°84 and 70)

n°70 : 8,14 to 14,41 mm

n°84 : 9,15 to 11,22 mm

Survival of 2 % ???

In 2016, 200 young mussels of 4 years released (marked with pink bees marks)

Maybe 2 still alive ????



Elez

100 Marked in april 2016.
In sept. 2016 : a box with 100 mussels (4 years / 8-9 mm)
Controled in nov. 2018 : 2 mussels (n°84 and 70)

n°70 : 8,14 to 14,41 mm

n°84 : 9,15 to 11,22 mm

Survival of 2 % ???

In 2016, 200 young mussels of 4 years released (marked with pink bees marks)

Maybe 2 still alive ????

Summer 2017 : the Elez « upstream » population was flooded / maintenance works in the hydro-electric dam downstream / + high temperature this summer…
= 50 % mortality
(from 1 154 mussels in 2014 to 620 in 2018)



Maneantoux

In 2016 : a box with 50 mussels (2 years / 4-5 mm)
Controled in nov. 2018 : 36 mussels (~ 14,5 mm)







Maneantoux

In 2016 : a box with 50 mussels (2 years / 4-5 mm)
Controled in nov. 2018 : 36 mussels **(72%)** (~ 14,5 mm)

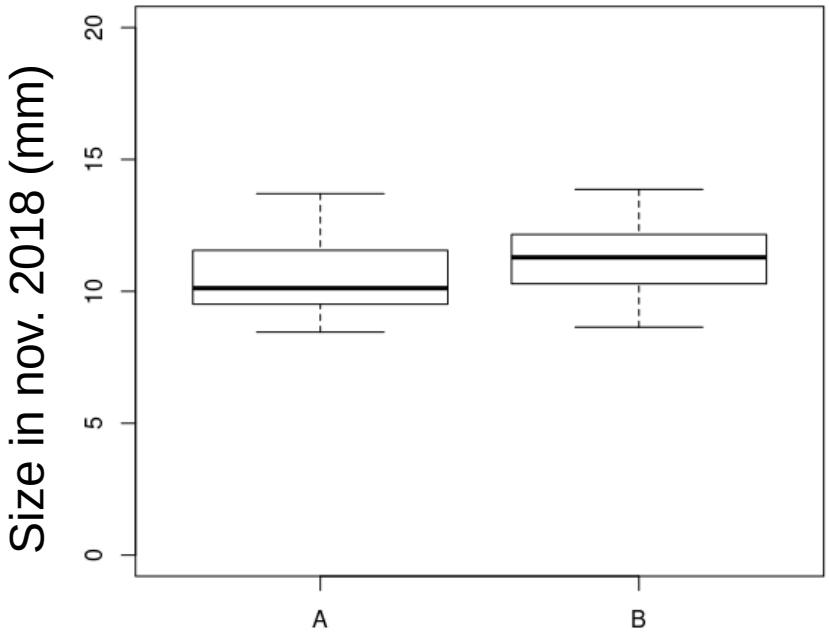
Around 10 000 juveniles 2+ released (2015 and 2016)

Maybe 7 200 still alive ???



Loc’h

In 2016 : 2 boxes (3 years / 4-5 mm)
Box A. 100 → 66 in nov. 2018
Box B. 50 → 39 in nov. 2018







Loc’h

In 2016 : 2 boxes (3 years / 4-5 mm)
Box A. 100 → 66 in nov. 2018 (66%)
Box B. 50 → 39 in nov. 2018 (78%)
Average of **72 %** survival

Around 1 000 juveniles 3 + released in 2016
Maybe 720 still alive ?????



Excavation experience

In 2018 on the Maneantoux river : unsucessfull…

Loc’h ?

Elez ?



Our needs :

- Need time to have a real idea of the success of our releasing efforts
- Need guidelines, workshops or meetings about releasing activities ?

Our limits for the in-situ breeding systems :

- Mussels can’t move
- Some systems reflects more the water quality than the sediment quality
- All could change from a micro-habitat to an other
- Some systems can be chewed… ;-)

Otter ?



In conclusion...

Conservation efforts in the long term

Need time and money

Freshwater pearl mussel life expectancy

Programme

Political time



Mesh tubes : Gantois society (fr)
(« *manchons cylindriques* », choice in size, diameter and mesh)

Test-tube plugs : CML society (fr)
(« *bouchons à ailettes de 11mm* », reference OBA11/01 for our mesh tubes of 1 cm diameter)



Mesh tubes : Gantois society
(choice in size, diameter and mesh)

1003177	MANCHON CYLINDRIQUE TM105768 INOX304L D11 H50 TISSU METALLIQUE INOX 304 L Vide nominal 0,42 mm fil Ø 0,20 mm (105768) Diamètre intérieur : 11 mm Longueur : 50 mm Assemblage génératrice par recouvrement et soudure électrique par points aux extrémités pour éviter effilochage	PIECE	36,000	10,900	392,400
1003176	MANCHON CYLINDRIQUE TM105712 INOX304L D11 H50 TISSU METALLIQUE INOX 304 L Vide nominal 0,80 mm fil Ø 0,315 mm (105712) Diamètre intérieur : 11 mm Longueur : 50 mm Assemblage génératrice par recouvrement et soudure électrique par points aux extrémités pour éviter effilochage	PIECE	36,000	11,250	405,000
1003175	MANCHON CYLINDRIQUE TM100812 INOX304L D11 H50 TISSU METALLIQUE INOX 304 L Vide nominal 1,5 mm fil Ø 0,50 mm (100812) Diamètre intérieur : 11 mm Longueur : 50 mm Assemblage génératrice par recouvrement et soudure électrique par points aux extrémités pour éviter effilochage	PIECE	36,000	11,100	399,600

Thank you very very much !

Thank you very very much !