SHELLFISH MARICULTURE IN THE RUSSIAN FAR EAST

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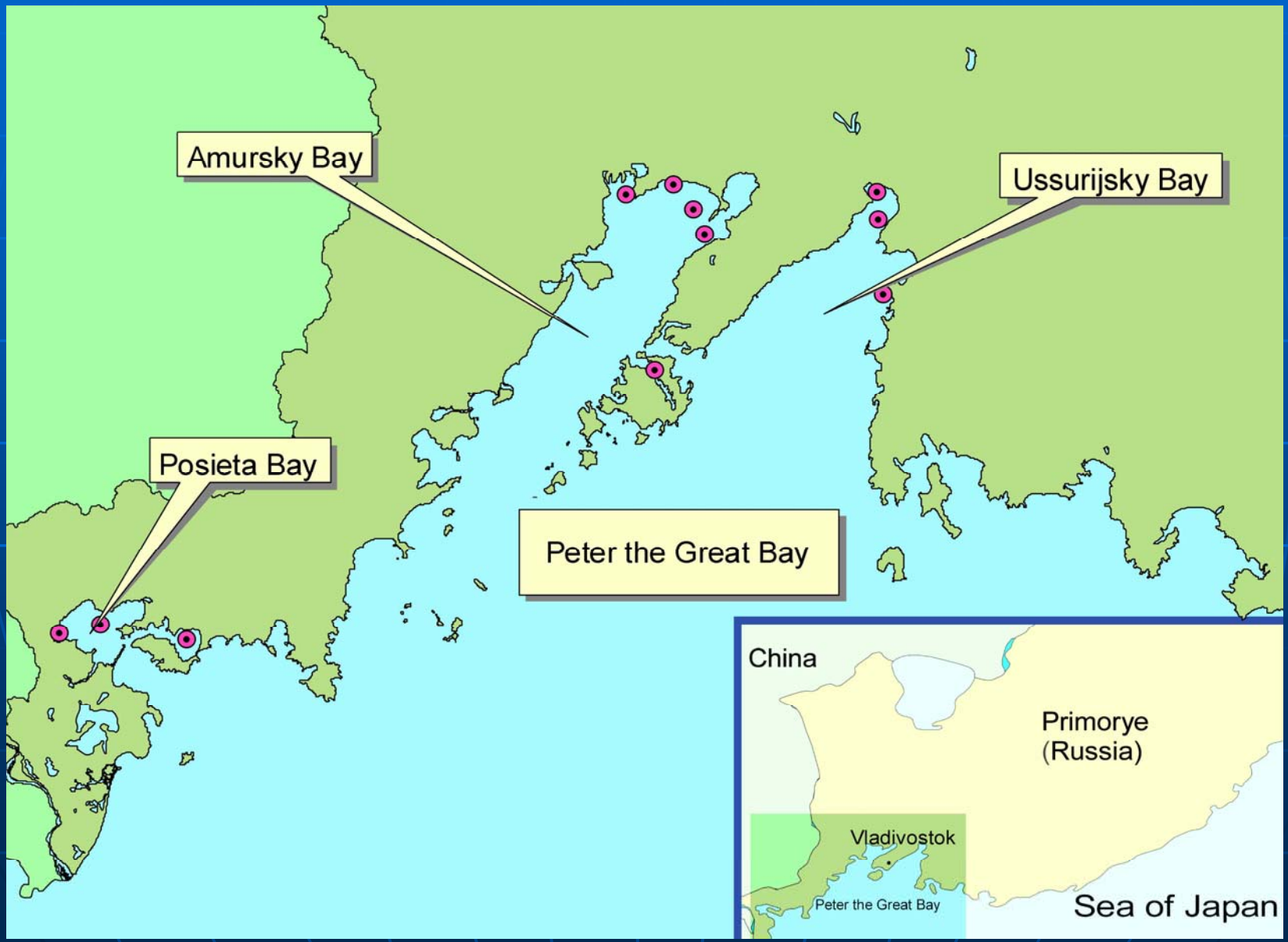
ALLOCATION OF OYSTER CONCENTRATIONS



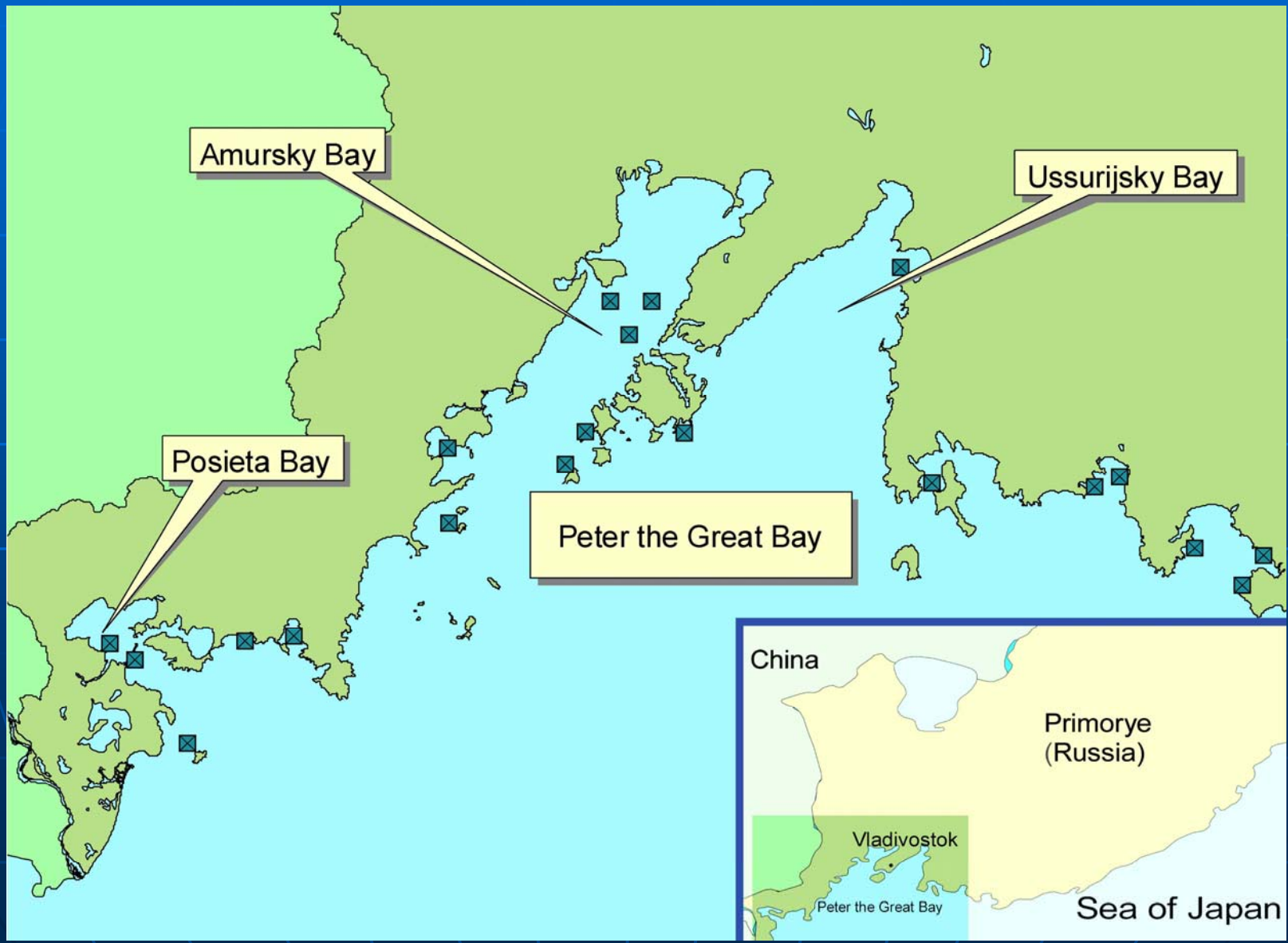
Biotechnology characteristics of the oyster cultivation

Concentration of the early stage larvae	1-2 thousand ind. per c.m.
Concentration of the late stage larvae	20-150 ind. per c.m.
Period of the collector exposition	June-August
Mortality	15%
Average number of spat in one collector	25-30 ind. per collector
Freeze-up period	December-April
Total survival until spat to commercial size	50%

Biotechnology characteristics of the mussel cultivation

Concentration of the larvae in Peter the Great Bay	1-2 thousand ind. per c.m.
Concentration of the larvae near eastern coast of Primorye	300 ind. per c.m.
Period of the collector exposition	June-July
Average number of spat in one collector	1 thousand ind. per collector
Average number of spat in one hectare	4 mln. ind. per ha
Biomass of the spat in one hectare	3.5 tons per ha
Freeze-up period	December-April
Total survival until spat to commercial size	50%

ALLOCATION OF SCALLOP CONCENTRATIONS



Biotechnology characteristics of the scallop

Concentration of the larvae	up to 100 ind. per c.m.
Period of the collector exposition in Peter the Great Bay	beginning June
Period of the collector exposition near eastern coast of Primorye	beginning July
Average number of spat in one collector	250 ind. per collector
Average number of spat in one hectare	4 mln. ind. per ha
Type of collector	Net bag containing the substrate
Total survival until spat to commercial size	50%

Scallop bottom cultivation

Period of spat cultivation in cages	September-April
Duration of bottom cultivation	3 years
Total survival until spat to commercial size	10-20%

Scallop cage cultivation

Period of spat cultivation in cages	September -April
Period of juveniles cultivation	2 years
including: density 20 ind per cage	1 year
density 10 ind per cage	1 year
Total survival until spat to commercial size	90%

- There’re some differences in the spat rate at present condition of the Japanese scallop reproduction within Peter the Great Bay limit and along the northern coast in Primorye.
- At present it’s like to suppose the average value of the “yield capacity” is due to be 4 mln. indiv. of spat per hectare in the standard plantation in Peter the Great Bay.
- It’s the exception in this case like the Posiet Bay where it’s registered the double increase of the spat collection and it’s yielded about 11 mln. indiv. per hectare of the standard plantation in this period.
- This index varies from 2 mln. indiv up to 4 mln. indiv.per hectare along the coast of Primorye.
- The yield capacity of spat per hectare is due to be up to 20 mln.indiv. in Aniva B ay.

- There's the inter-annual dynamic of the spat index too. It has registered the great variety in the index of spat from 400 to 1,000 individuals per collector, average 700 individuals per one in the most reproductive area in the Posiet Bay for the last 10-year period.
- It's collected up to 70 mln. individuals of spat per year in this area only. It's quite enough such amount of the spat material to set the seeds at the present sea farms in the Posiet Bay. Moreover these sea farms sell the spat to all sea farms in the Primorye region.

- For the first time in Primorye such works were carried out in Posiet Bay. This water area belongs to moderate productive regions according to primary production and seston concentration.
- For the calculation of maximal load on to some parts of Posiet Bay during oyster, mussel and Japanese scallop cultivation an original model was worked out.
- In opinion of the model's authors Bregman and Kucheryavenko the most complete idea about potential load is given by the method relying on a variety of characteristics. They are: size of plantation, water activity in the bay, concentration of suspended matter (seston) in different sites of plantation, quantity of mollusks, and rate of filtration.

- So for example according to the calculations the trophic base in the Minonosok bay is due to provide the growth of spat about 70 millions indiv. or 1.5 mln. pcs of the commercial scallops. It has really collected 40-120 mln. individuals of spat in the area of 18 hectares for the last years. Moreover the amount of the late age mollusks cultured on the cages was due to be above one million individuals. It's resulted in the decrease of the growth rate of the shellfish in the cages and bottom plantations too.
- In 3-year-old cage scallop, the live body weight decreased by two time, while the muscle weight decreased by 1.3 time. The decrease of the growth rate of mollusks is observed in the bottom plantation show the biomass to be above 800 g per sq.m.

- So it can be used the extensive technologies in mariculture based on the collection of the spat material in the sea at present conditions of the natural reproduction of the abovementioned species of mollusks.
- The summarized data on the productivity of the mollusk plantations is shown in the table.

Species	Number of spat, mln. Ind./h	Commerce product, t/h	Product 2005, t	Term of culture, year
Crassostrea gigas	2	45	-	1-2
Mytilus trossulus	4	36	100	2
Mizuhopecten yessoensis				
cage	2-11	27	1000	2,5-3
bottom	-	15	-	4-5

- Thanks the activity of mariculture farms it's restored the number of the Japanese scallop in the Posiet Bay and constructed several tens of plantations in another area of Peter the Great Bay and it's resulted in the increase of the annual yielded crop to 1,000 tons.
- There's the great role of these mollusks in ecosystem of the bay as well and first of all in the transformation of organic matter to seston in gulf and in turn it's proved to be a cause for increasing of the quickly assimilated detrit in the bottom sediments as a base of nutrition in the next parts of the trophic chain. At the same time the change for the worse the environment and bottom biocenosis are caused by the excess of the suspended accumulation and connected organic matter in the bottom sediments in the sea farm situated area.

- According to the practice experience the proposed model of calculation is like to be applied in the estimation of the real carrying capacity in the area of bays.
- It was observed the accumulation of organic sediments and decrease of the number of the benthos species in the bay occupied by the plantation to 20 per cent and amount of the cultured shellfish was exceeded by two times the calculated figures.