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**Sex Ratio as One of the Major Factors
Promoting the Invasion
of the Round Goby
(*Neogobius melanostomus*)
in the Gulf of Gdansk**



Invasion of the round goby

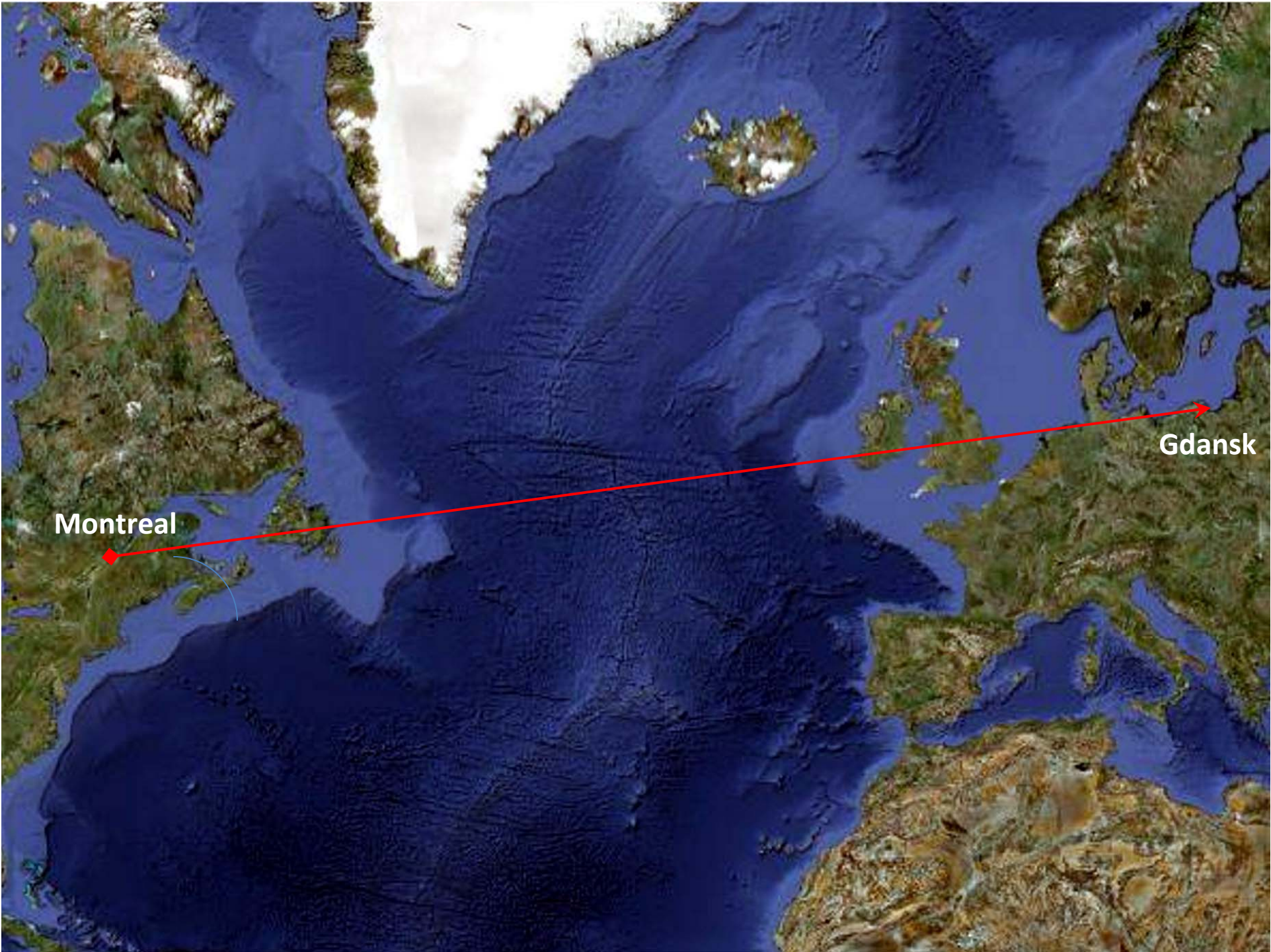
the Gulf of Gdańsk



the Great Lakes



1990



Montreal

Gdansk

Population features

Main zone of occurrence	Shallow water, bottom
Preferred type of bottom	Solid (rocks, stones, gravel)
Size	up to 25 cm TL
Life span	3 - 4 years
Period of spawn	J F M A M J J A S O N D
Sex ratio (M:F)	(3) 2 : 1
Multi spawners	Yes
Nests building and defense	Yes
Nests substrate	Solid (stones, rocks, concrete, wood, wastes)
Pelagic forms in life	No
Occupied waters	Marine ⇒ Brackish ⇒ Fresh water
Range of migration	Short
Type of food	Bivalves, arthropods
Commercial value	Unimportant (up to now)

Nest size

Plutnica Mouth
 Ostonino
 Gdynia
 Gdansk

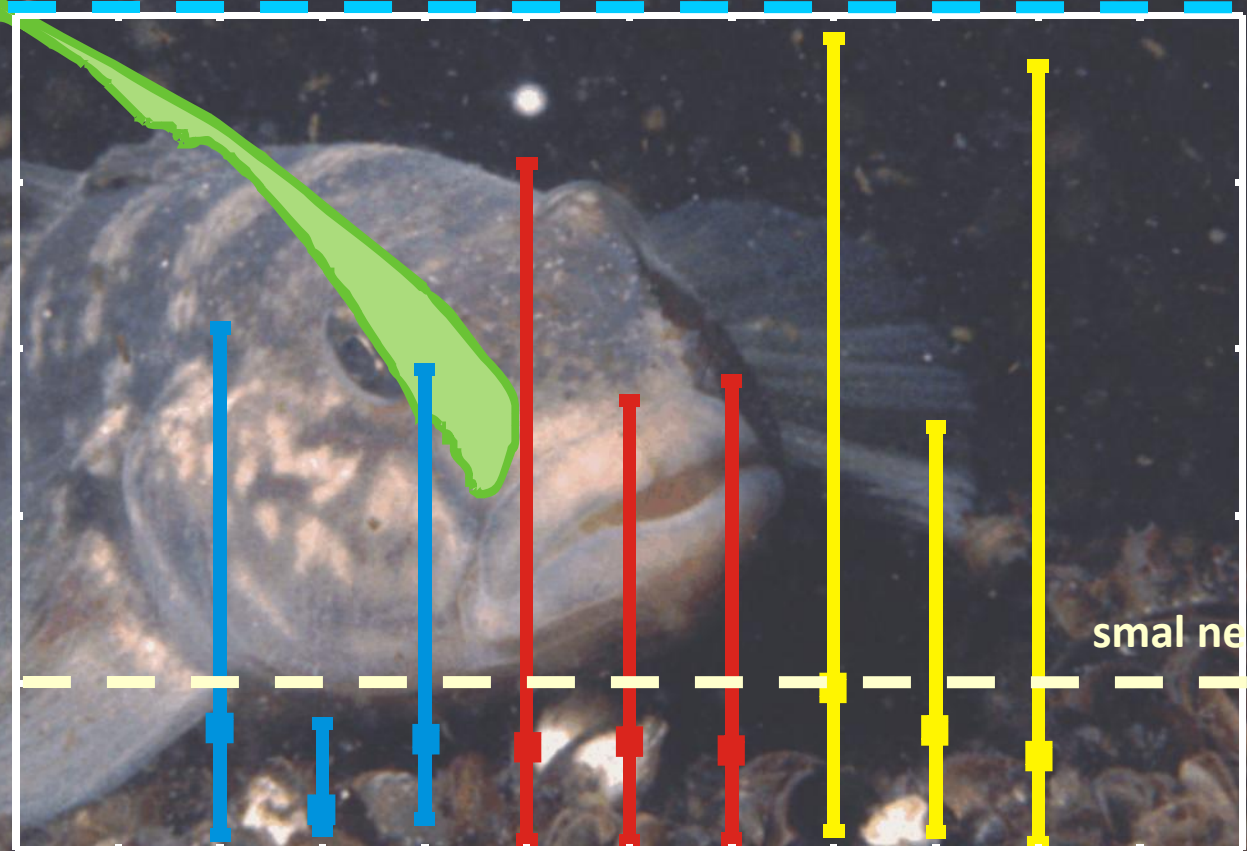
Kuznica

big nests

eggs number in nest

Kovtun 1979

small nests



year place
 06 07 08 06 07 08 06 07 08
 Ostonino Plutnica mouth Kuznica

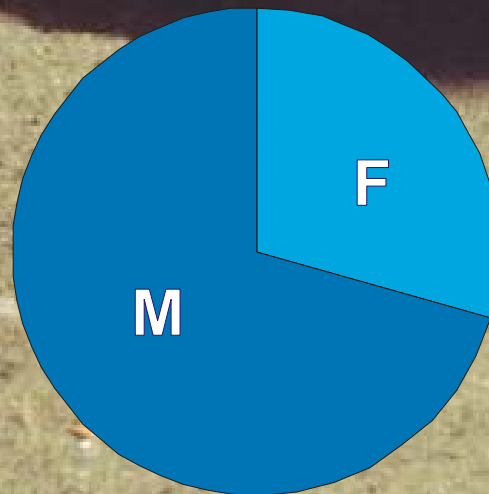
■ Average
 I Min-Max

Sex differentiation environmental factors

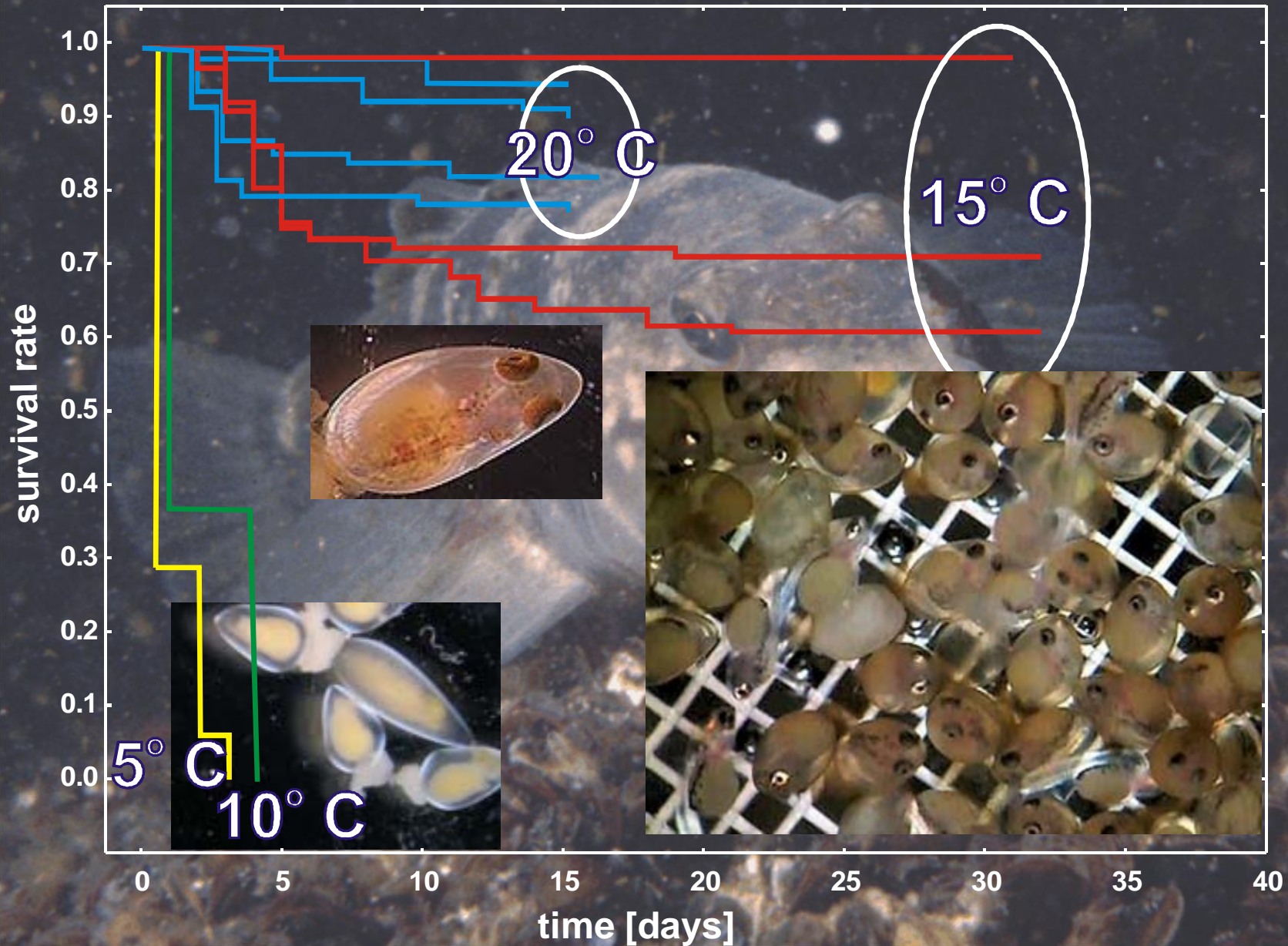
Temperature 5, 10, 15, 20 °C

Salinity 0, 7 PSU

pH 7, 7.5, 8



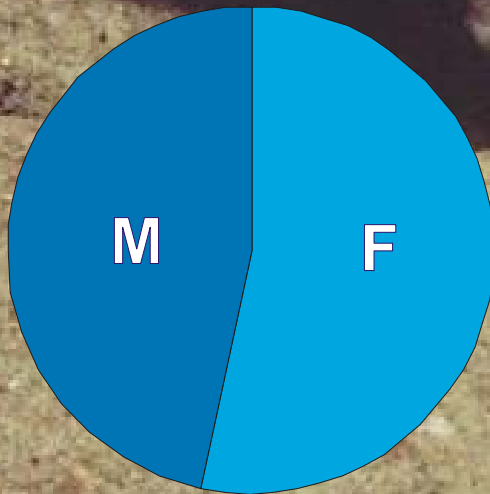
Embryogenesis temperature dependent success



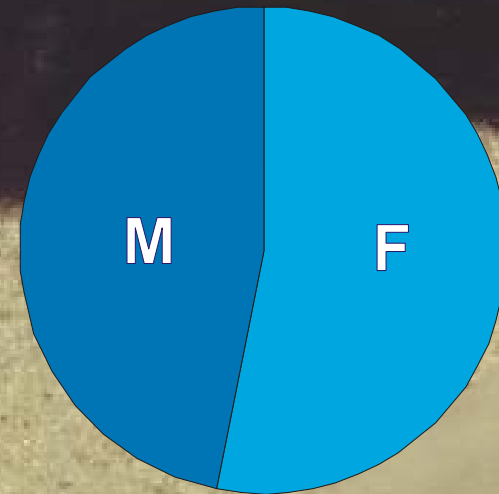
Sex differentiation genetic factors

Gynogenetic first generation

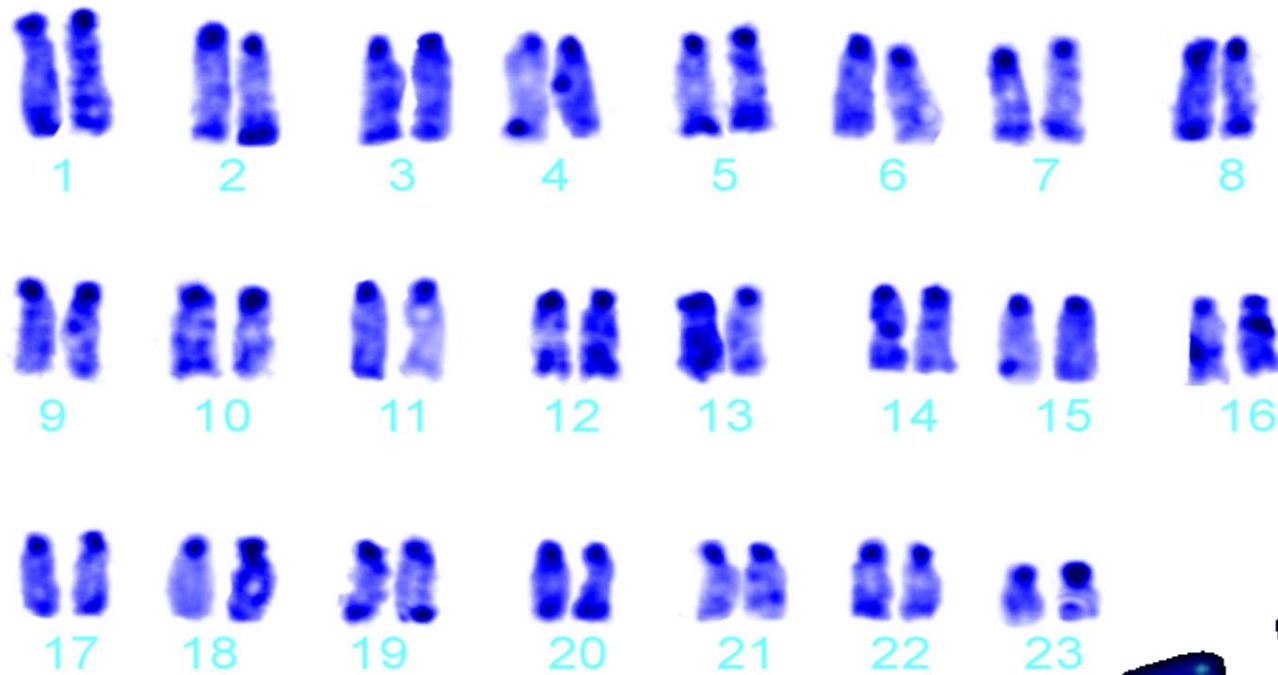
15 °C



20 °C



W Z Sex differentiation system



**Karyotype of the round goby,
 $2n=46$ (FN=46)**

**Metaphase chromosomes of the
round goby after Fluorescent
In Situ Hybridization (FISH) with
telomeric probe**



Conclusions

- **Domination of males results in smaller nests and higher reproduction success**
- **Changes of environmental conditions (temperature, salinity, pH) do not influence the round goby sex ratio significantly**
- **Round goby females are sexually heterozygotic (WZ system). Sex ratio in first gynogenetic generation is 1:1**
- **All 46 round goby chromosomes are subtelo to acrocentric, there are no significant morphological differentiation**



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