97th Annual Meeting of the National Shellfisheries Association

Microsatellite-based parentage analysis of factorial crosses in Pacific oyster (*Crassostrea gigas*) larvae and spat

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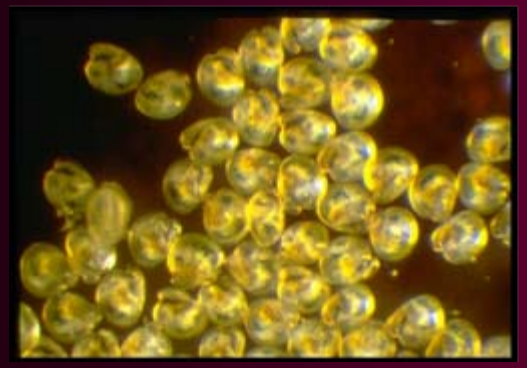
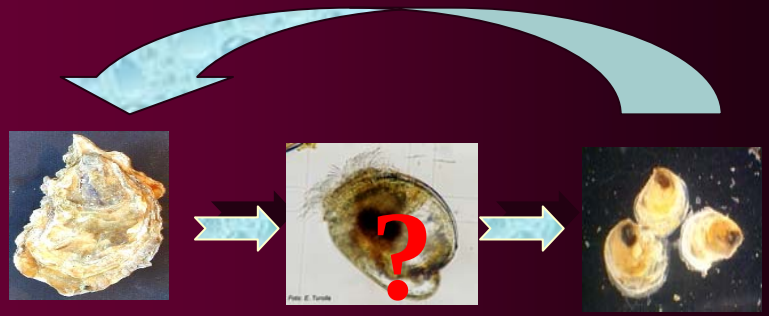
Two possible sources of oyster spat

(1) natural settlement

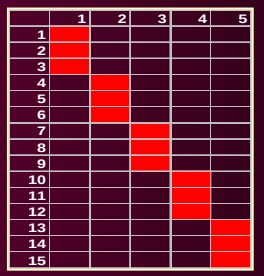
(2) hatchery propagation

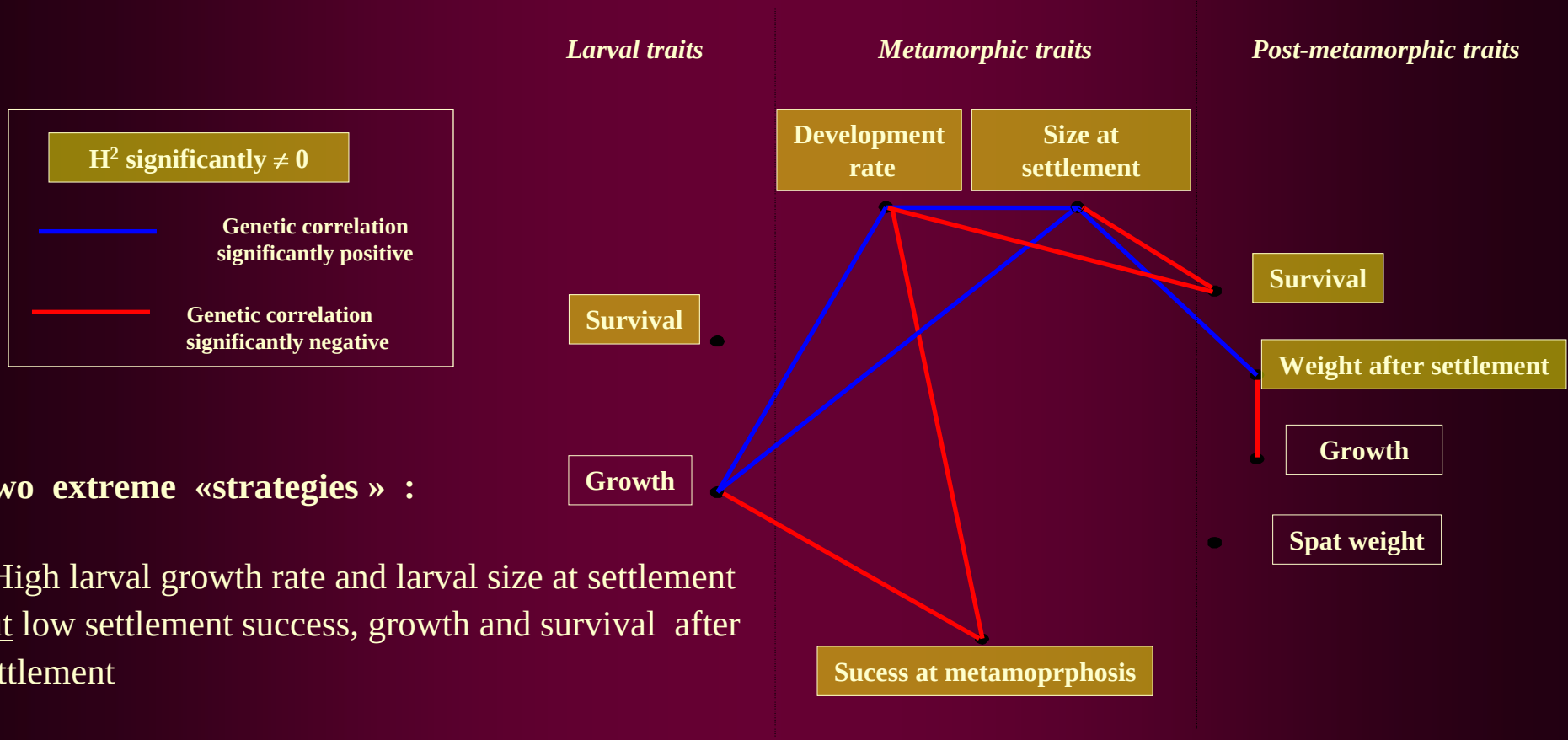


Is there selection (**domestication**) at early development stage in hatchery ?



Genetic variablity of early life traits





Two extreme «strategies » :

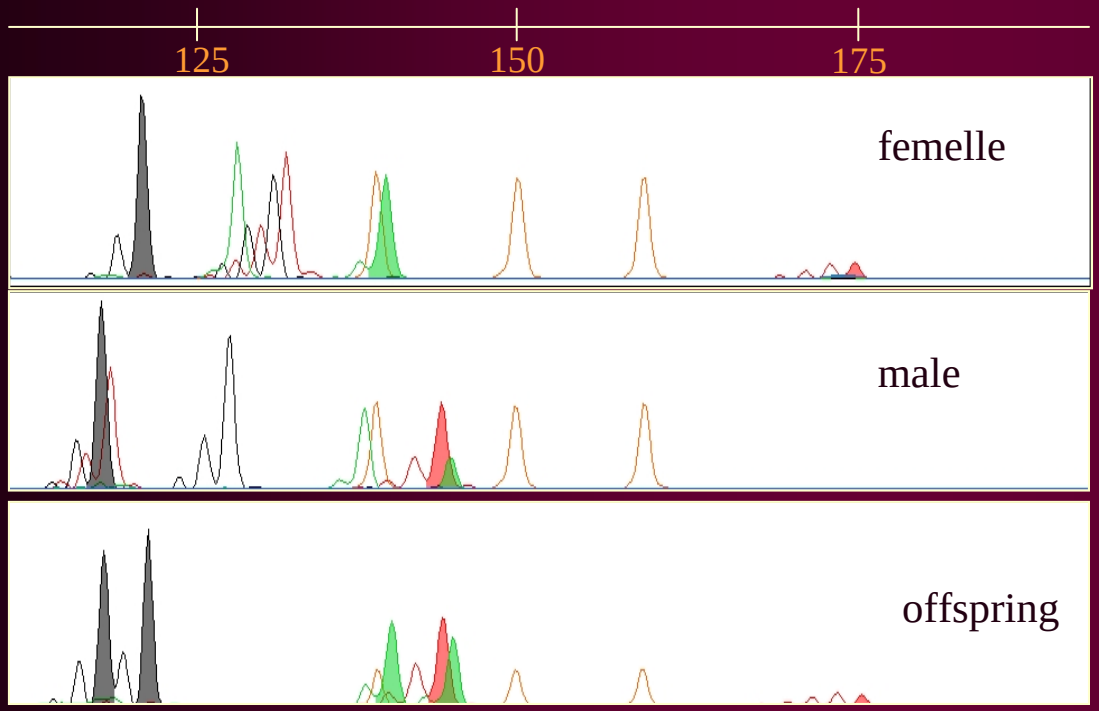
• High larval growth rate and larval size at settlement <u>but</u> low settlement success, growth and survival after settlement

• Lower larval growth rate and larval size at settlement <u>but</u> higher settlement success, growth and survival after settlement

Ernande et al., 2003

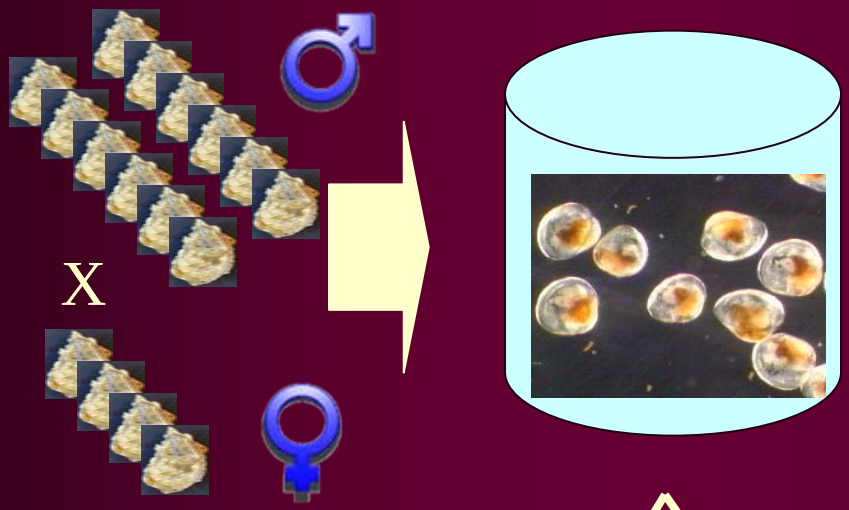
Mixed-family approach :
microsatellite-based parentage analysis

One set of 3 PCR-multiplexed markers
Cg108 + Cg49 + L10

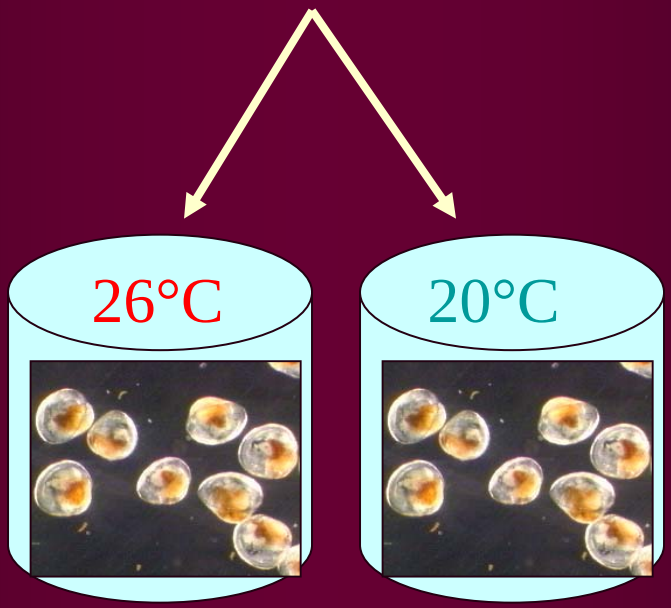


- More families
-Homogeneous rearing conditions
- G x E ?

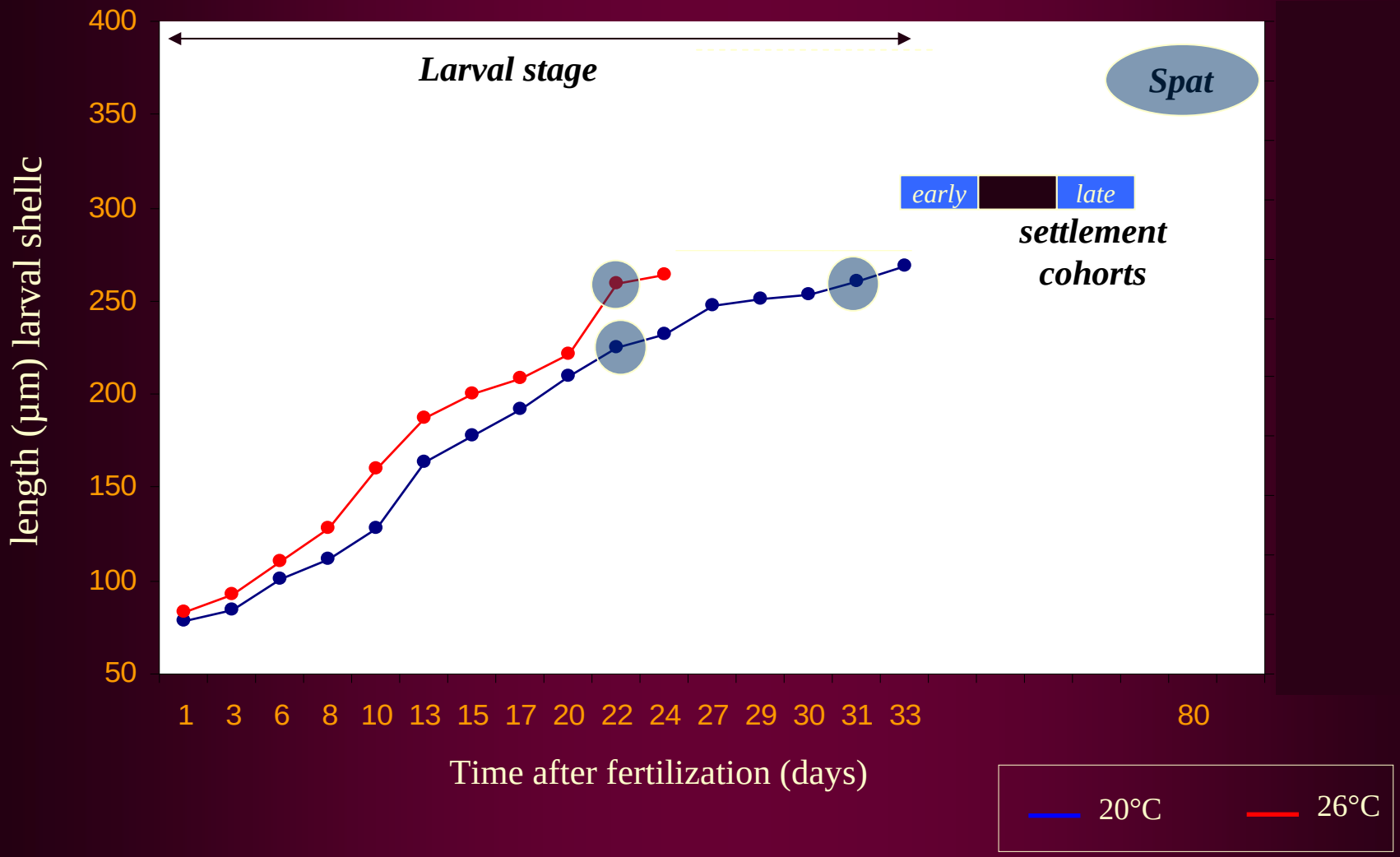
“Wild” versus “hatchery” conditions ?



4 females x 12 males cross



Phenotypic trend & sampling



Results

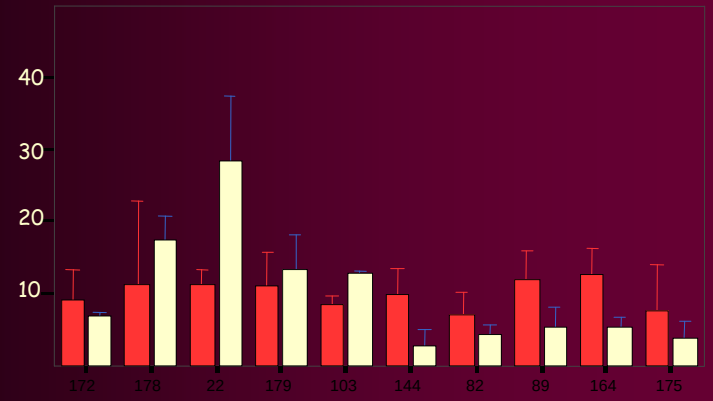
Studied traits based on individual larvae assignment data

A Parental contributions

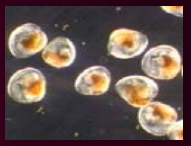
SAS macro Glimmix
Littell *et al., 1996*

B Larval growth

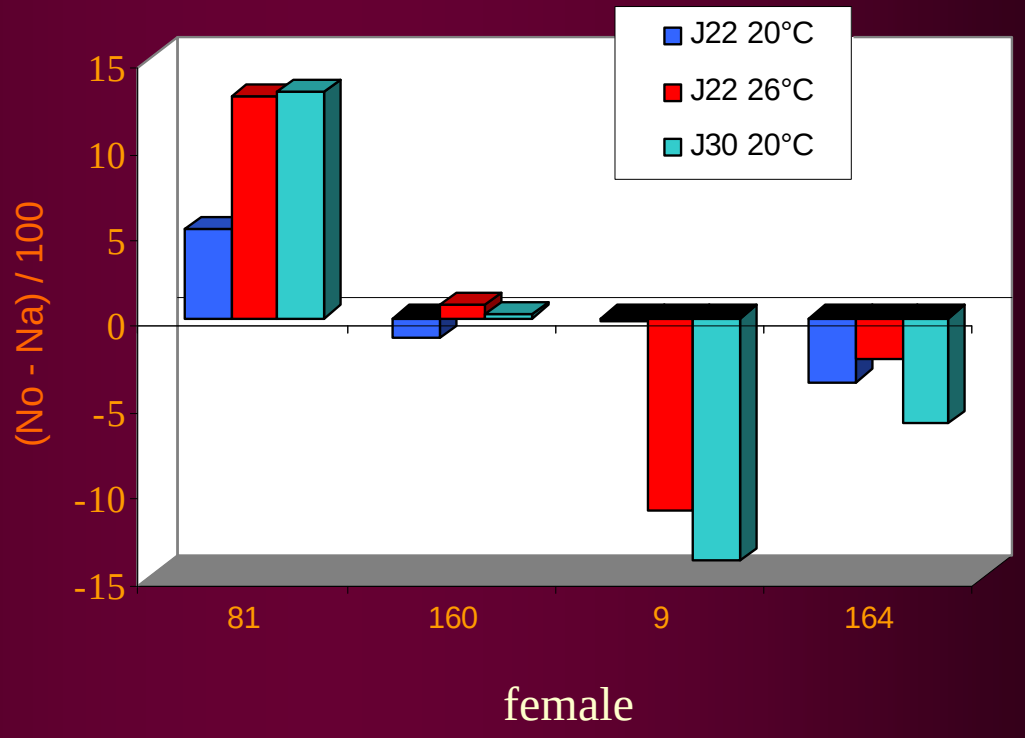
SAS/STAT® Proc Mixed



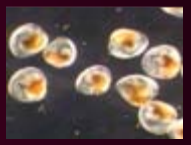
A Variance of female reproductive success



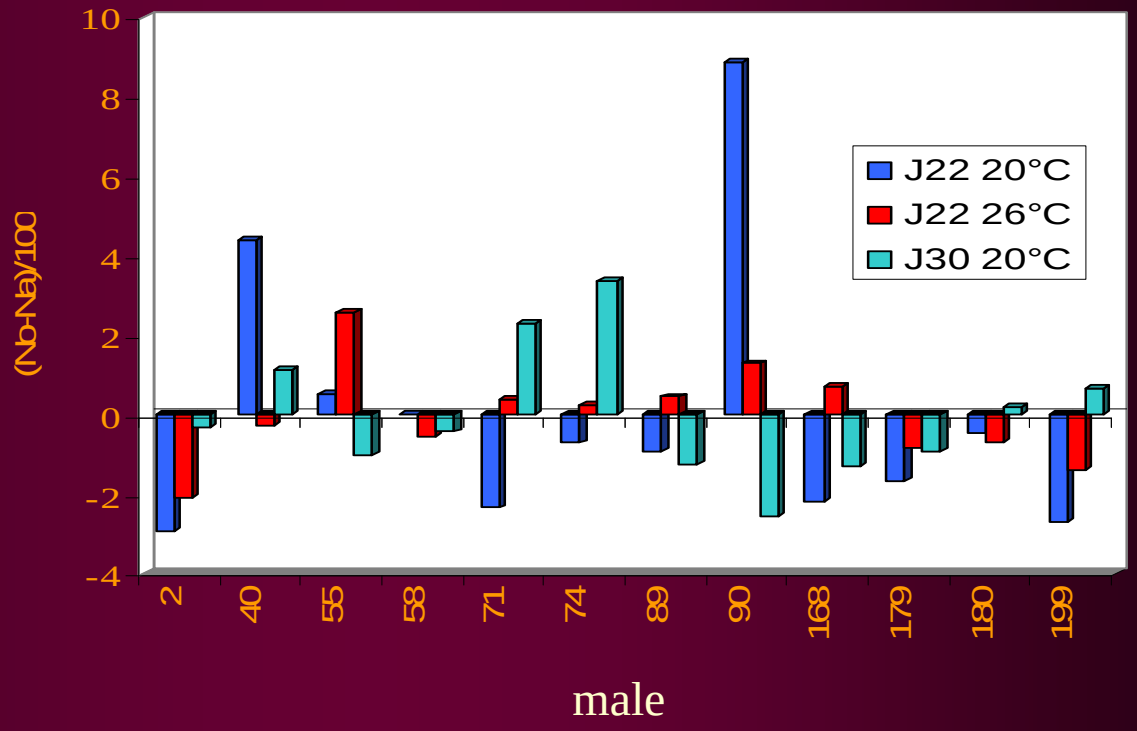
Observed maternal contributions relative to mean hatching rate at Day 1



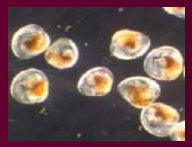
A Variance of male reproductive success

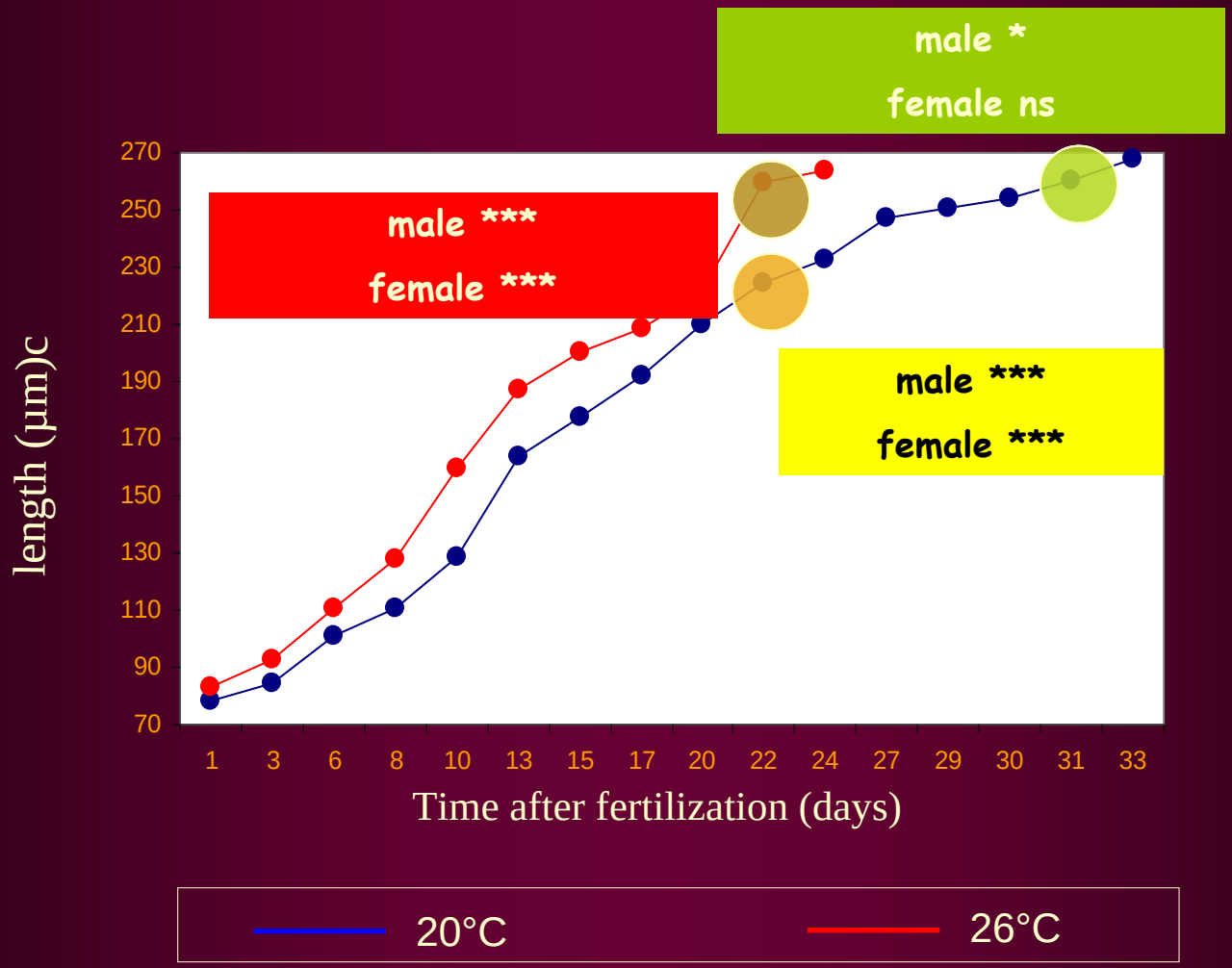


Observed paternal contributions relative to mean hatching rate at Day 1

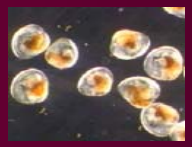


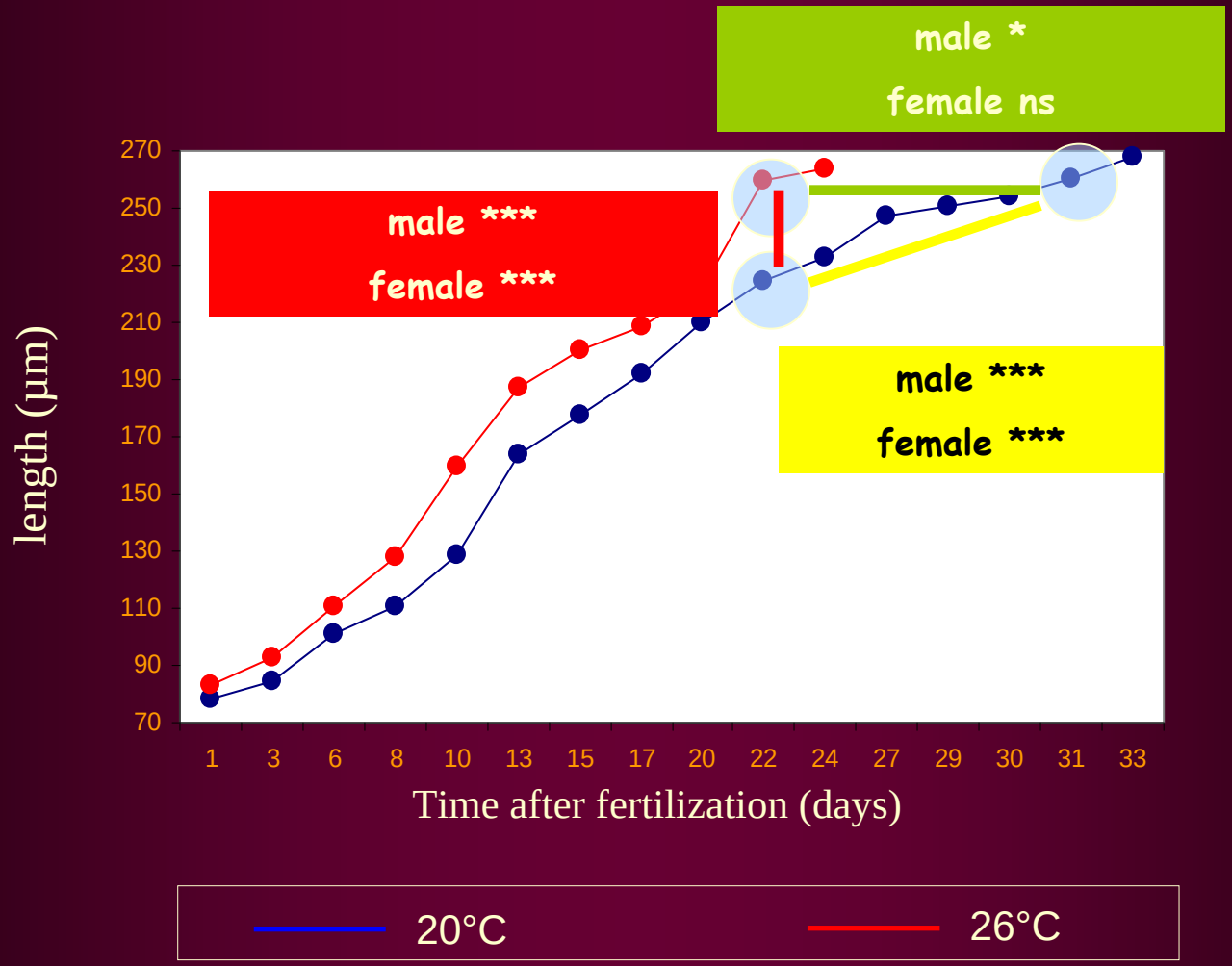
A Parental contributions



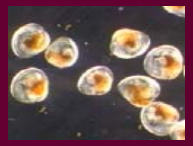


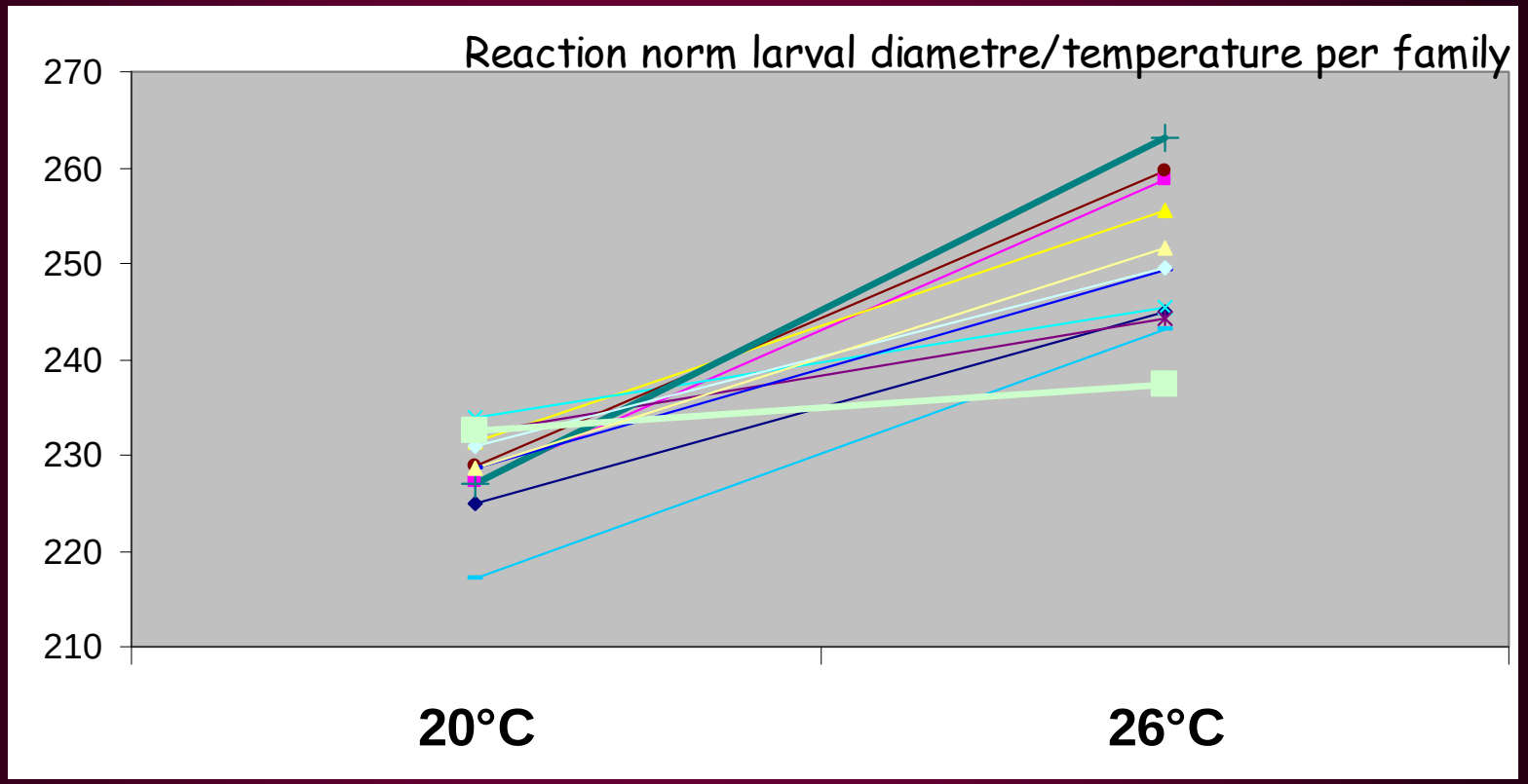
A Parental contributions





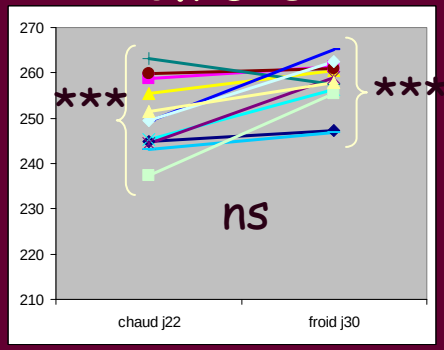
B Larval size



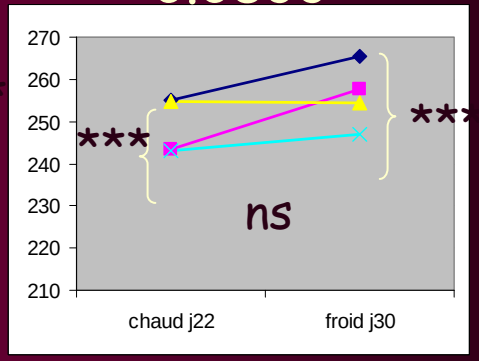


Male	ns	p<0.05
Female	ns	p<0.05

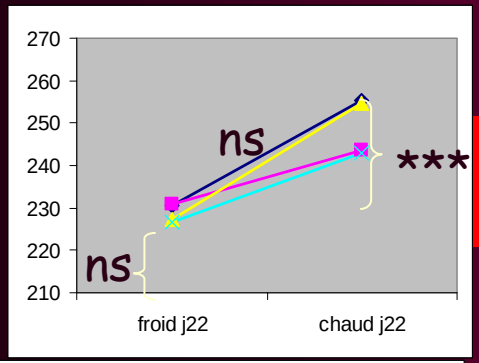
0.7518



0.0833



0.1307



male ***

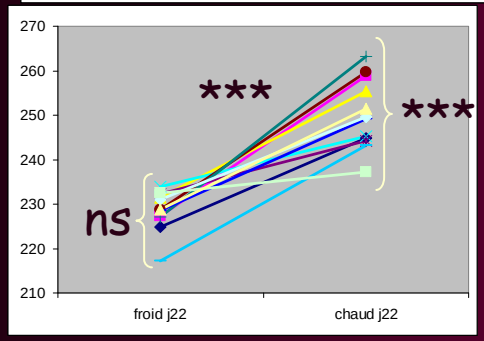
female ns

male ns

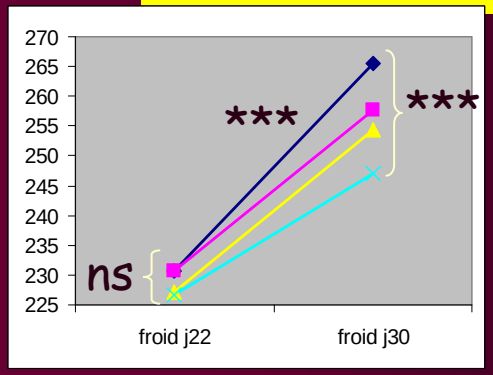
female ns

male ns

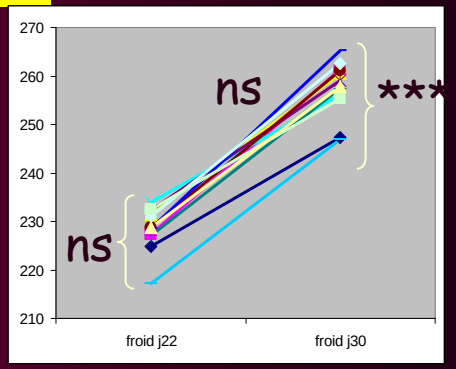
female ***



0.0006

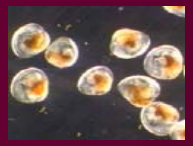


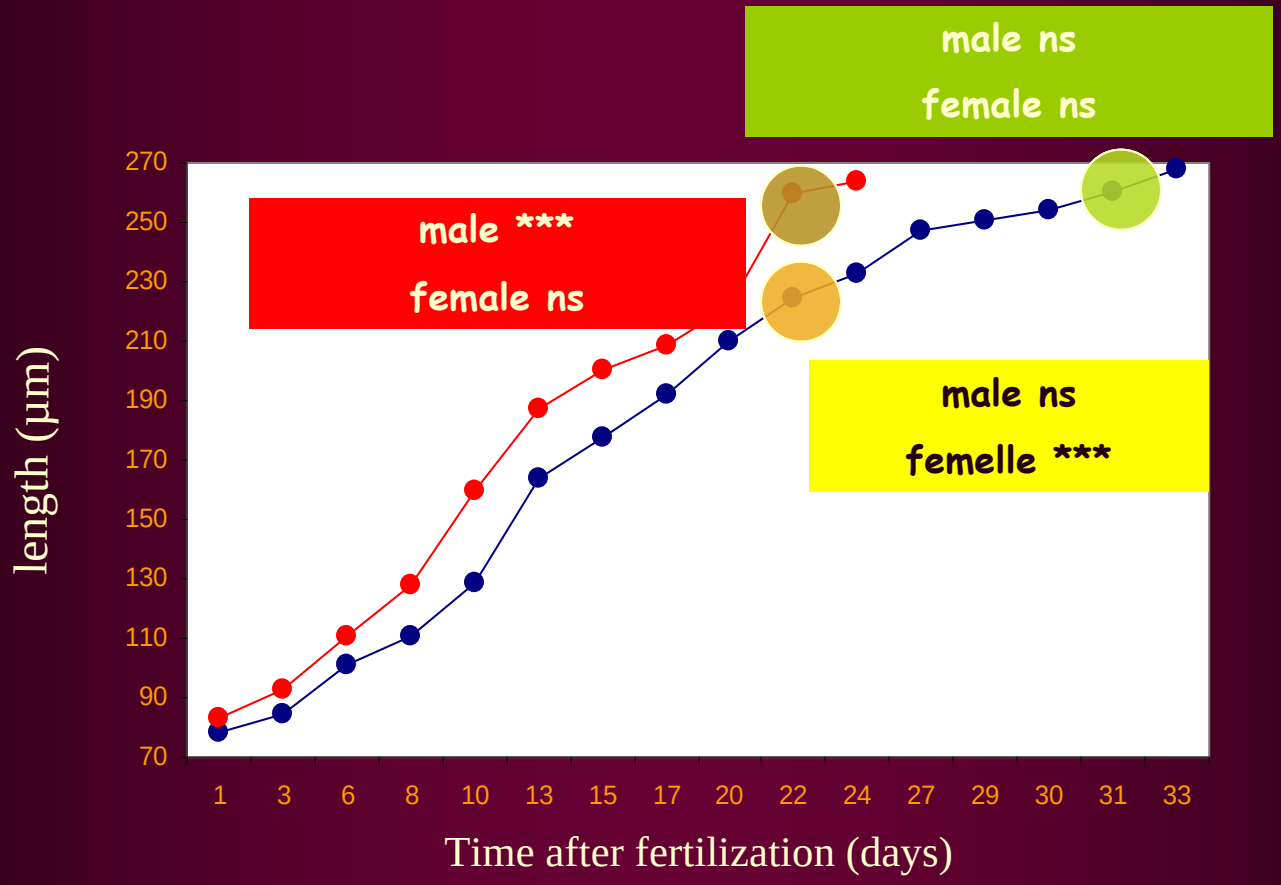
0.001



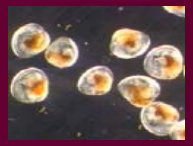
0.4386

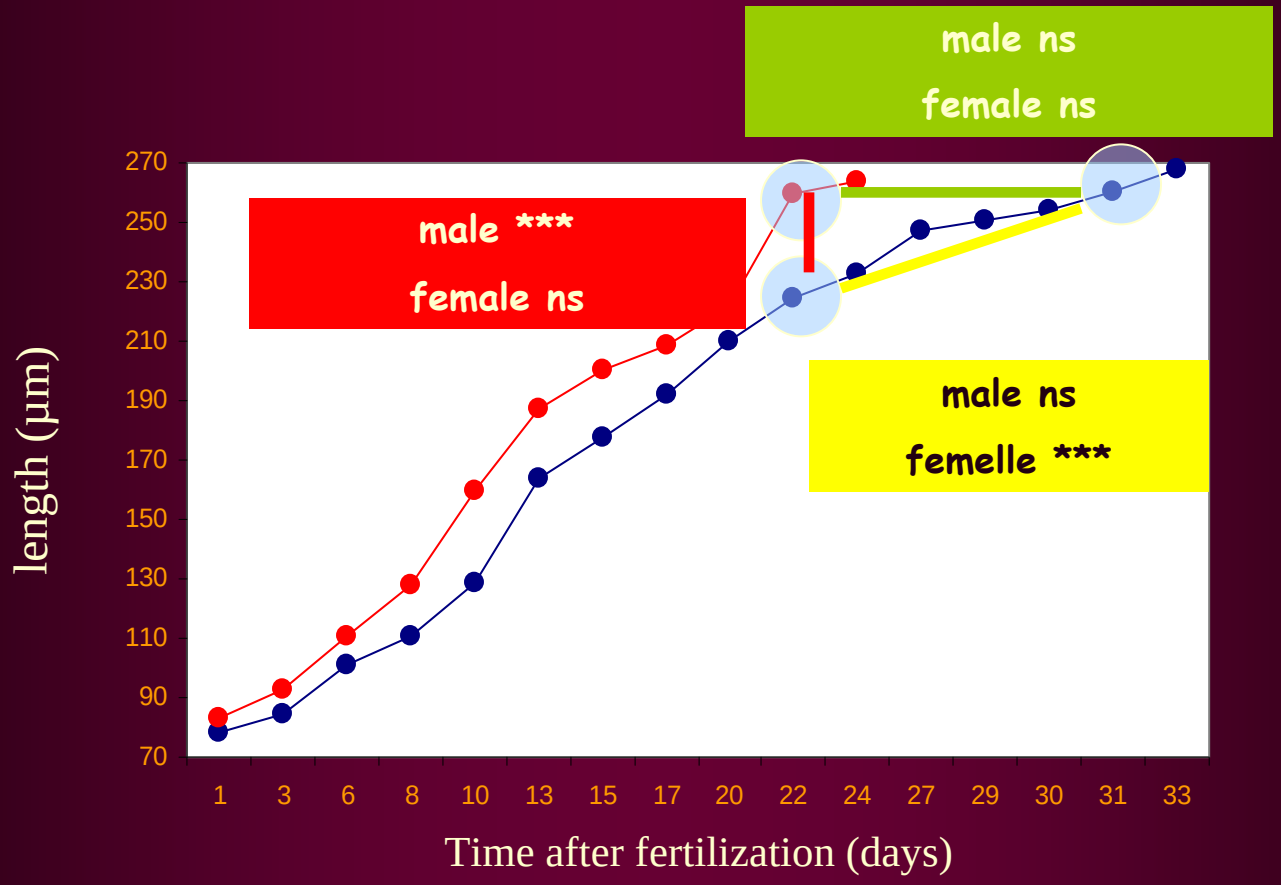
B Larval size



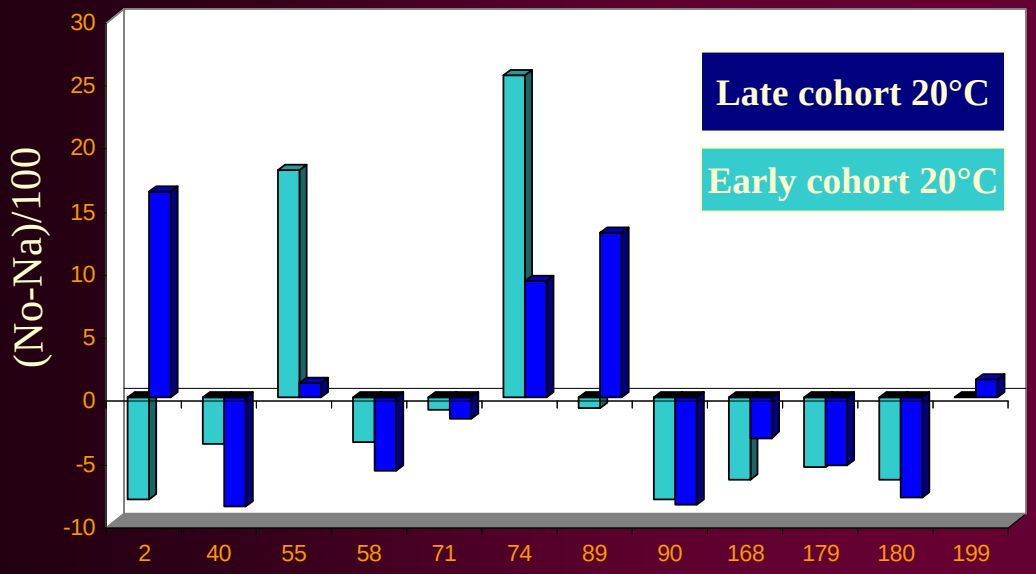


B Larval size

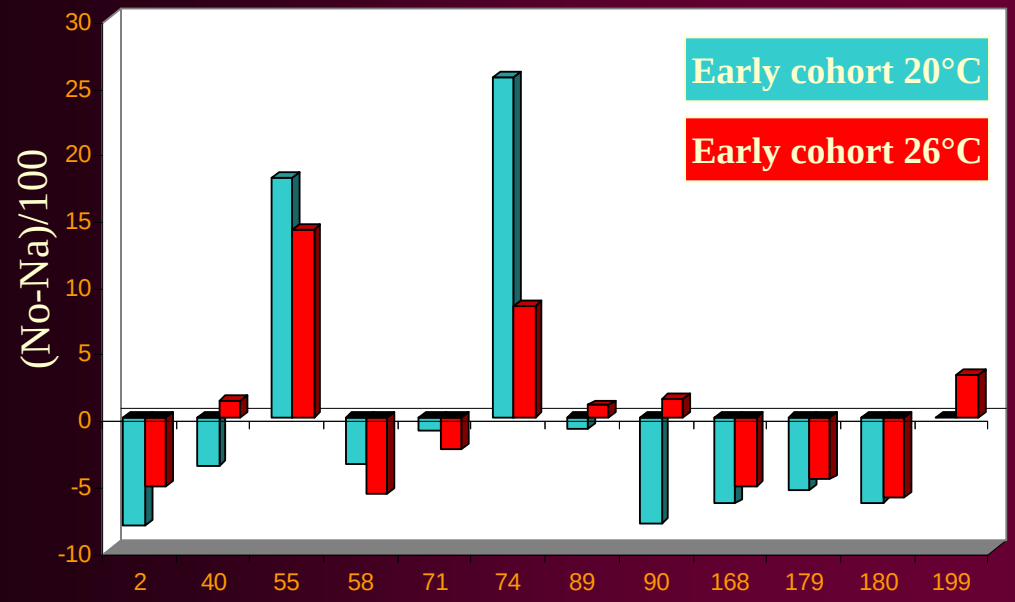




Paternal contributions at day 80 (spat)

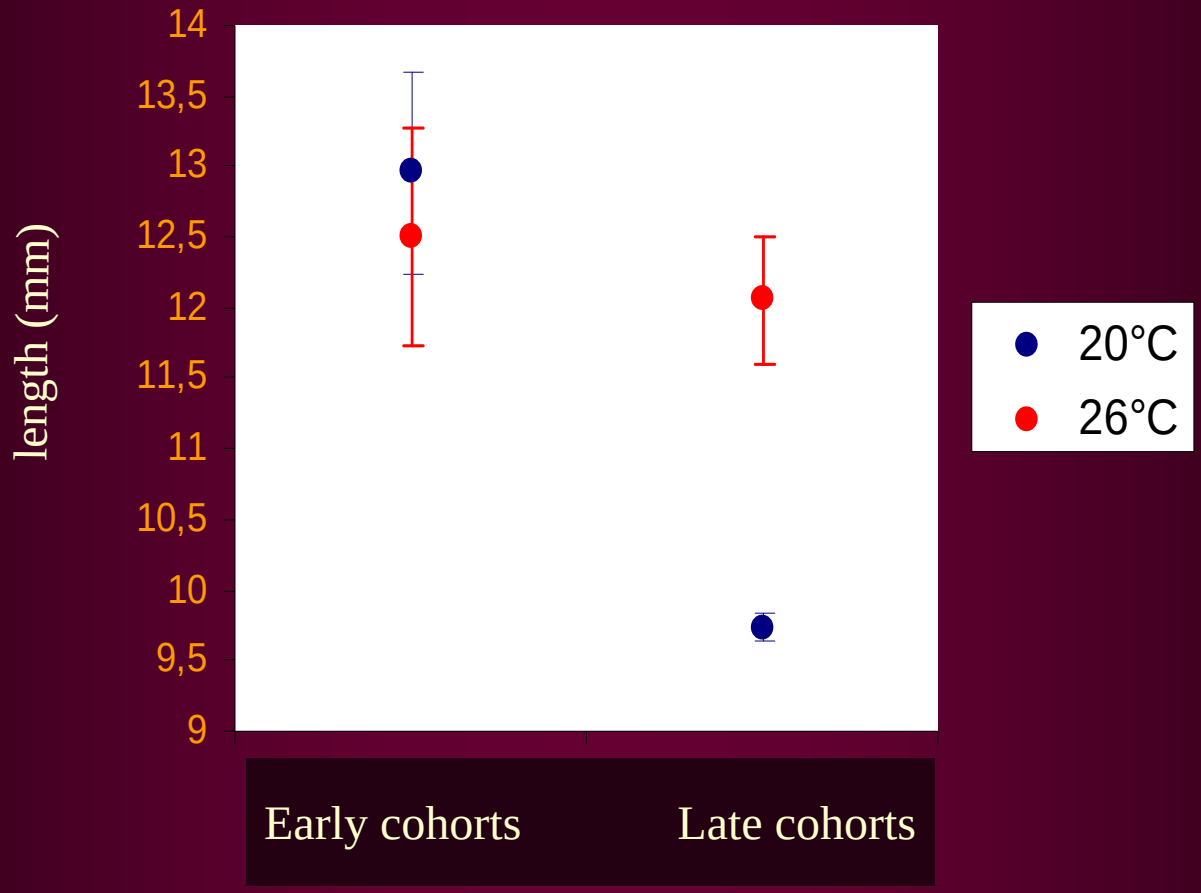


Significantly different contributions between early and late cohorts at 20°C (same result at 26°C)

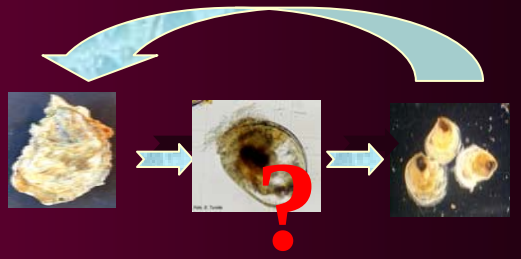


Significantly different contributions between early cohorts at 20°C and 26°C (same result for late cohort)

Spat growth


length (mm)
14
13,5
13
12,5
12
11,5
11
10,5
10
9,5
9
Early cohorts
Late cohorts
20°C
26°C

Conclusion



TECHNICALLY

- As individual tagging is impossible at early life stages, marker-based parentage analysis of mixed families represents an efficient tool to study genetics of larval traits

SELECTION AT LARVAL STAGE ?

- Significant differences are observed between progenies

-Temperature influences the expression of genetic variability for growth and survival