

Development of new methods for long term preservation of silkworm bioresources.

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1 2 3 4 5 6 7 8 9 10 11 12
5 generations

300 larvae

600 trays in spring season

More than 90% of the mutant strains of silkworm in the world are collected and systematically preserved.



National Bio-Resources Project (NBRP)

This Project had been started in 2002 under supporting by the Ministry of Education, Culture, Sports, Science and Technology Japan.

Purpose

1. Collection
2. Preservation
3. Distribution

for **Bioresources** that are basic materials for life sciences research.

The 3rd season starts in April, 2012.

29 Bio-resources of NBRP Japan

gen

Mice

Silkworms

Cellula, slime molds

Pathogenic microorganisms

ES Cell

Microorganisms

DNA

Animal Cells

E.coli

Baci subt

Yeast

Rice

Wheat

Barley

Morning Glory

Lotus

Glycine

Chrysanthemum

Tomatoes

Arabidopsis

Algae

Drosophila

X.tropicalis

Japanese macaques

Celegans

Rats

Zebrafish

Medaka

Quintessential Ojaponicas

Available resources

<Domesticated silkworm>

- Mutant strains 500
- Improvement strains for artificial diet 200
- Transgenic strains 100

<Wild silkworm>

- *Antheraea yamamai* 5
- *Antheraea pernyi*, *Samiacynthia* 1

<Genome>

- 220,000 clones (DNA / cDNA) from 50 libraries



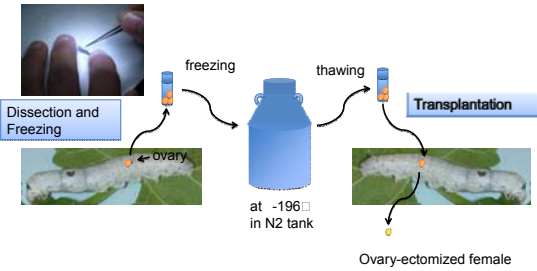
You can get eggs year-round

month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Before this Project (normal)	x	x	x	o	o	o	x	x	x	x	x	x
Acid treatment*	x	x	x	x	x	x	o	o	o	o	Δ	x
Artificial ^h ibernation	o	o	o	o	x	x	x	x	x	x	Δ	o
After this Project	o	o	o	o	o	o	o	o	o	o	Δ	o

o □ Distribution is okay.
When we use the egg laid in June*

Long- term preservation

□ use of frozen ovaries □



Two improvements

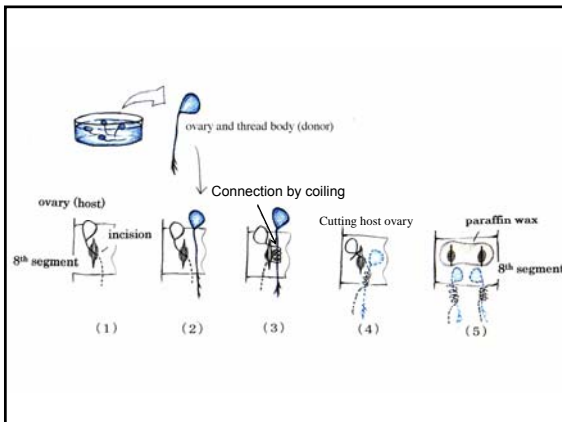
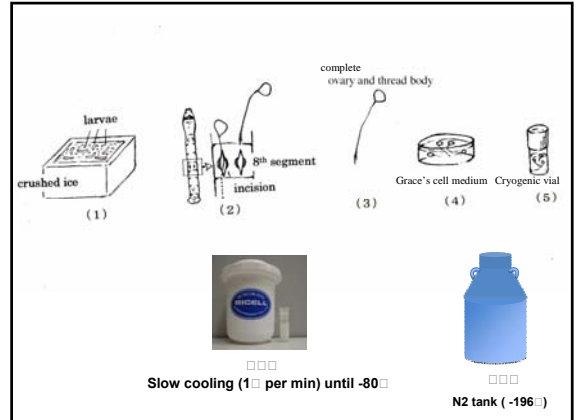
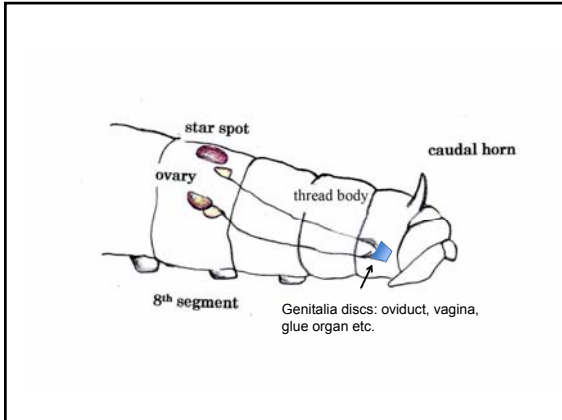
(1) Slow cooling (1□ per min) until -80□ of the donor ovaries in the freezing step.

To do this modification, I use BICELL freezing vessel. This equipment is commercially available.

→ We can freeze the ovaries gradually.



(2) Connecting the thread bodies between host and donor individuals in the transplantation step.



Effect of using BICELL on the cooling process of the donor ovaries

Group	Survival rate (%)	Number of eggs	Number of embryos	Number of larvae	Number of pupae	Number of adults
Control	100	100	100	100	100	100
BICELL	100	100	100	100	100	100
...

* indicates a significant difference from the control at the 5% level by the t-test.

Effect of the connection of the tread bodies between host and donor.

Host	Donor	Host + Donor	Host - Donor	Host * Donor	Host / Donor	Host * Donor / Host + Donor	Host * Donor / Host - Donor
1	1	1	1	1	1	1	1
1	2	1	1	1	1	1	1
1	3	1	1	1	1	1	1
1	4	1	1	1	1	1	1
2	1	1	1	1	1	1	1
2	2	1	1	1	1	1	1
2	3	1	1	1	1	1	1
2	4	1	1	1	1	1	1
3	1	1	1	1	1	1	1
3	2	1	1	1	1	1	1
3	3	1	1	1	1	1	1
3	4	1	1	1	1	1	1
4	1	1	1	1	1	1	1
4	2	1	1	1	1	1	1
4	3	1	1	1	1	1	1
4	4	1	1	1	1	1	1

* indicates a significant difference from the control at the 5% level by the t-test.