Inbreeding Depression

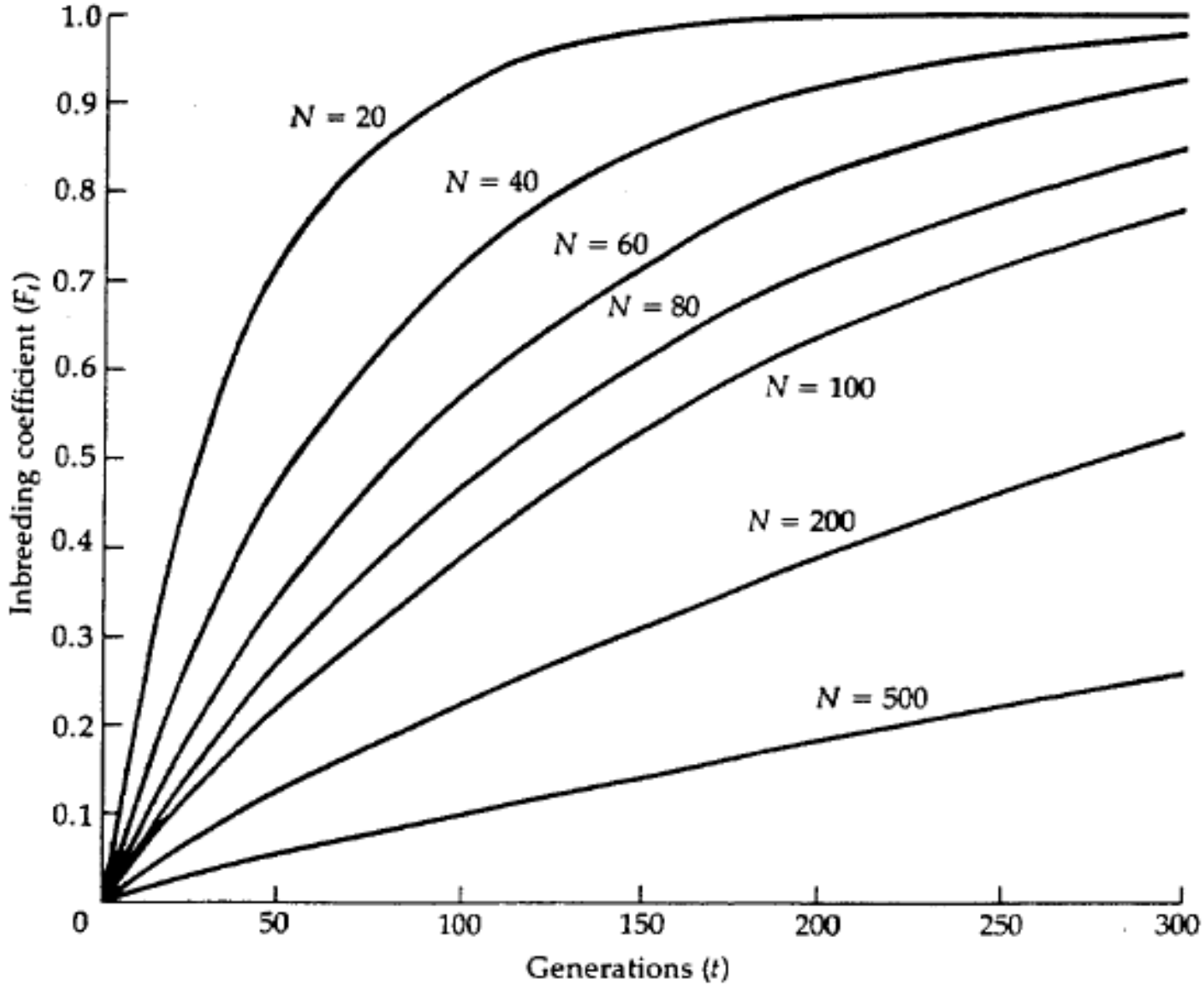
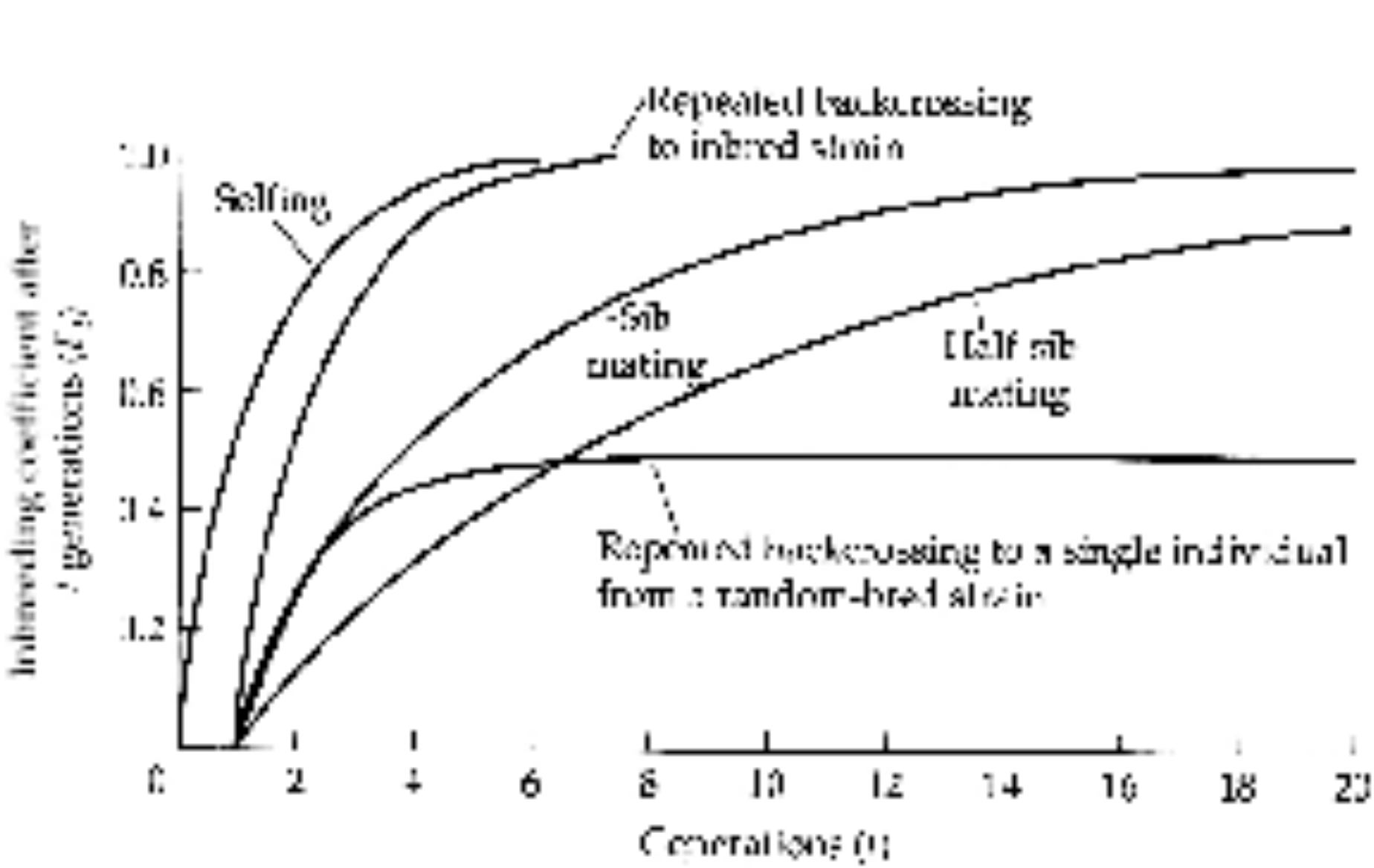


Figure 9. Increase of F_t in ideal populations as a function of time and effective population size N.

Hartl & Clark


Repeated backcrossing
to inbred strain
Selfing
Sib
mating
Half sib
mating
Repeated backcrossing to a single individual
from a random-bred strain
0.8
0.6
0.4
0.2
0
2
4
6
8
10
12
14
16
18
20
Generations (t)

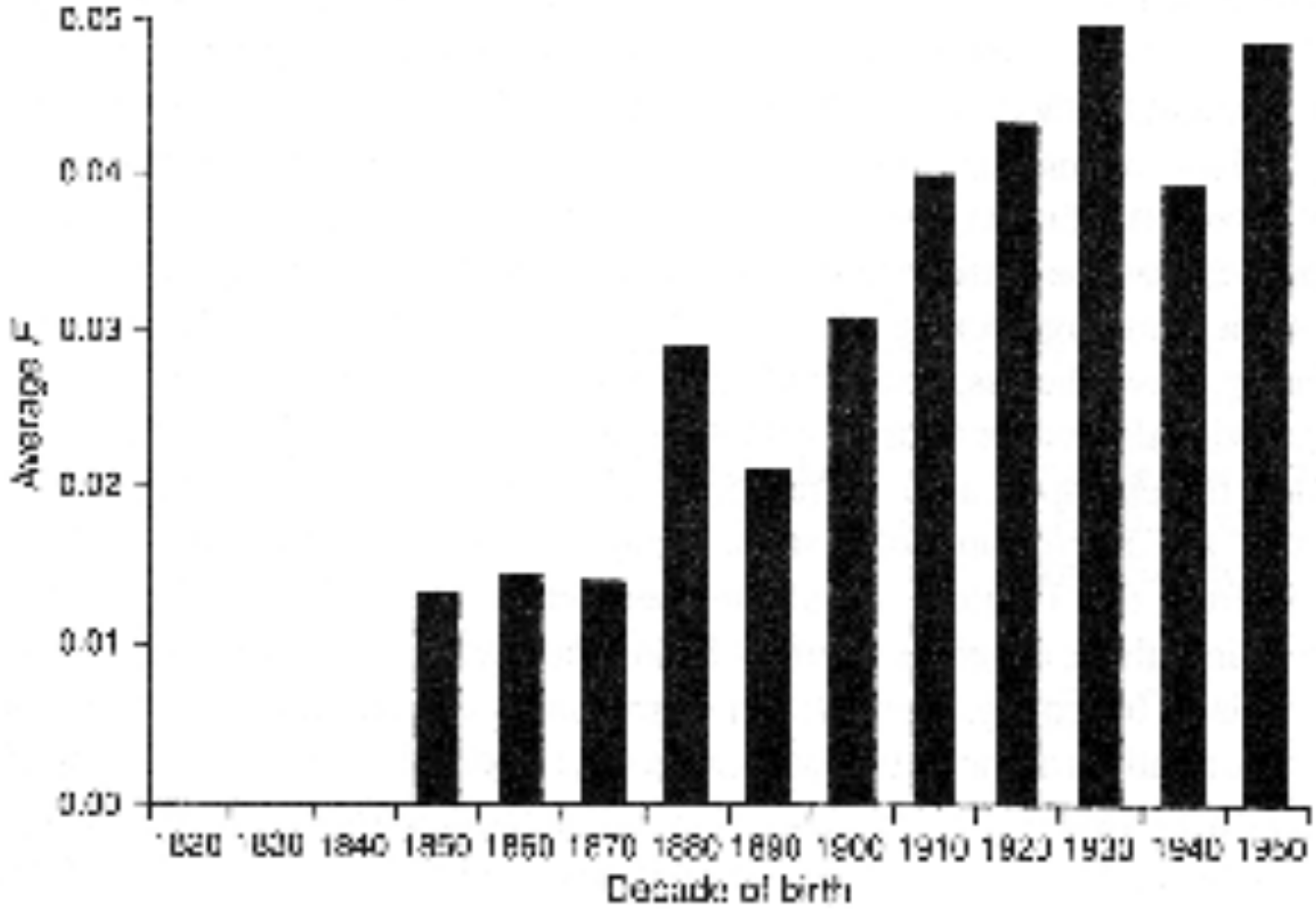


Figure 3.6. Average pedigree inbreeding coefficient for human population on Tristan da Cunha as function of decade of birth.

Inbreeding depression

- Reduction in fitness within progeny produced by the mating of closely related individuals

$$\delta = 1 - \frac{\text{fitness of inbred offspring}}{\text{fitness of outbred offspring}}$$

Inbreeding depression

- Reduction in fitness within progeny produced by the mating of closely related individuals

$$\delta = 1 - \frac{\text{fitness of inbred offspring}}{\text{fitness of outbred offspring}}$$

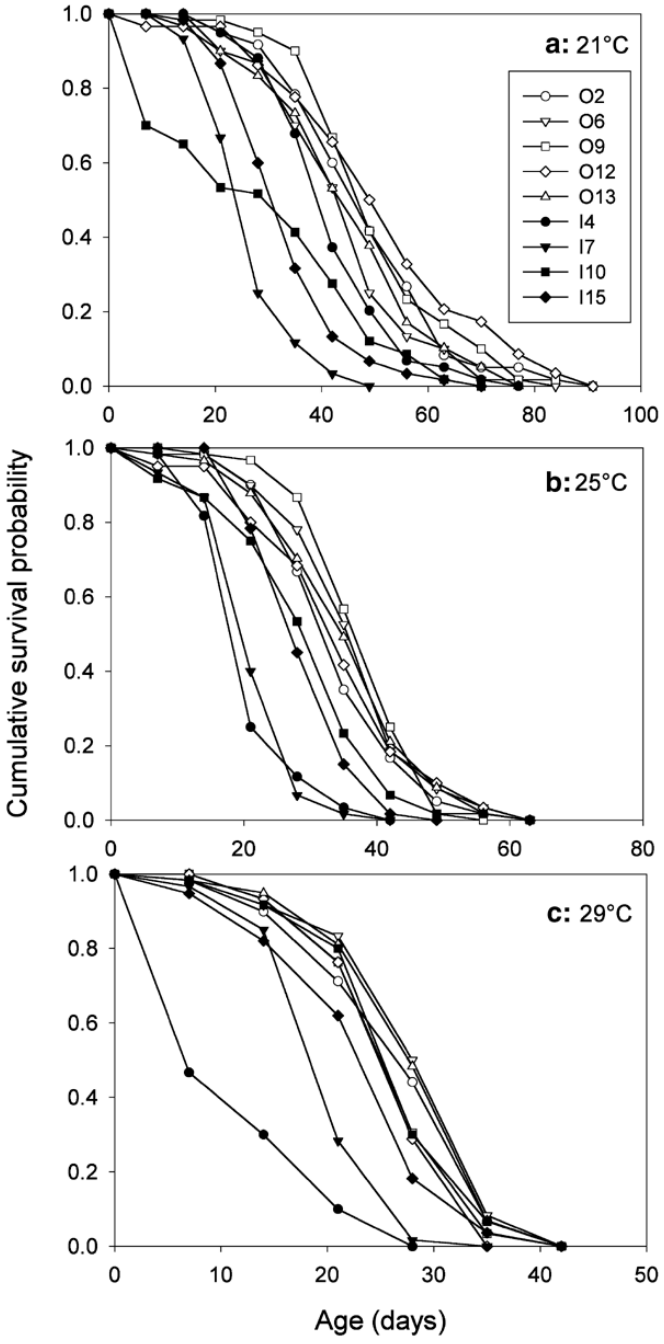
- Need to specify level of inbreeding
  - Juvenile survival of Dorcas gazelle
  - Sib matings (F = 0.25) = 0.405
  - Outbred population (F = 0) = 0.720

$$\delta = 1 - \frac{0.405}{0.720} = 0.44$$

Inbreeding depression

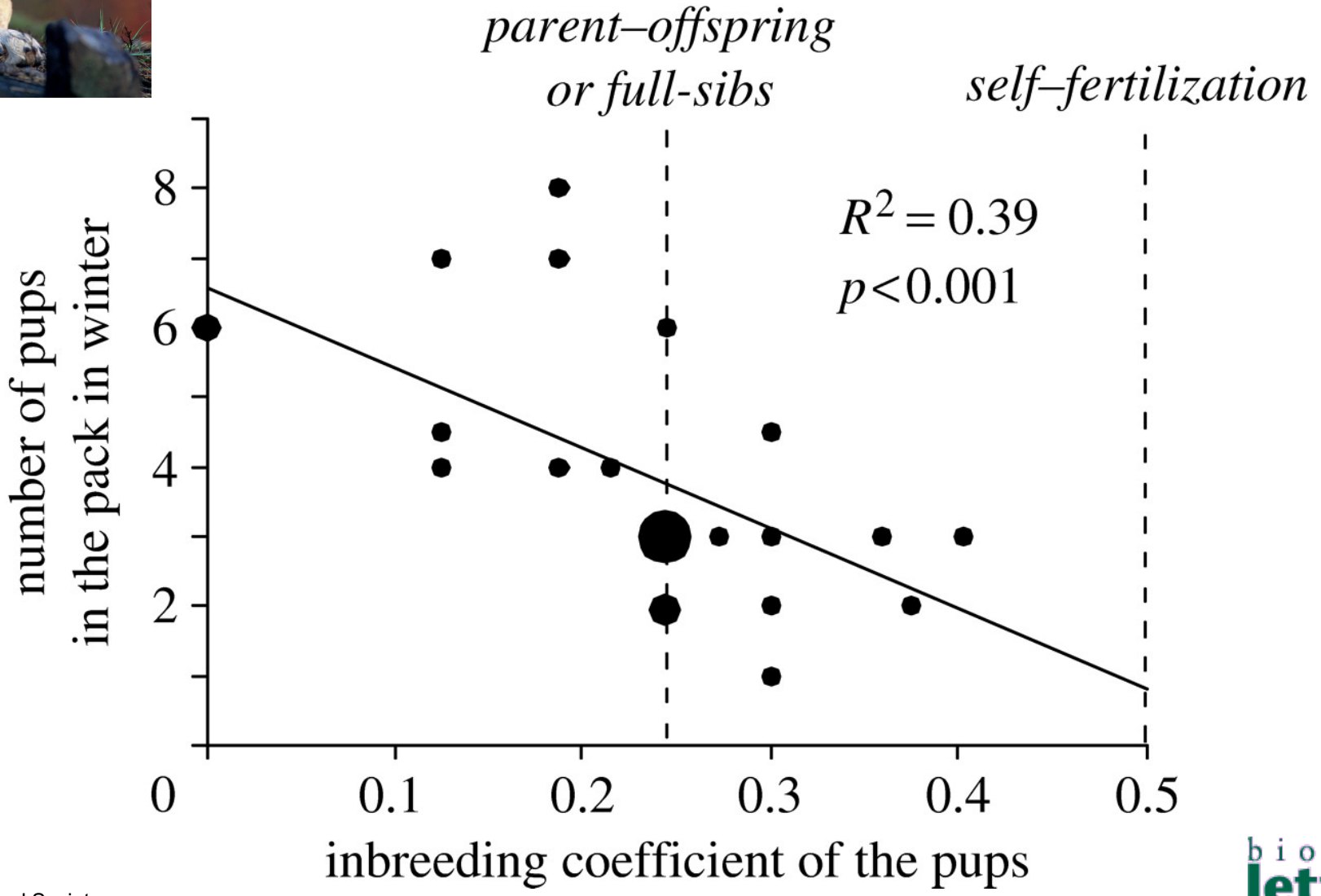
- All components of reproductive fitness subject to ID
- Characters closely related to reproductive fitness show more ID than peripherally related characters
- ID greater for total fitness than its components
- Families, populations, species differ in extent of ID
- ID proportional to amount of inbreeding

Inbreeding depression



Vermeulen and Bijsma 2004

Inbreeding depression



Liberg O et al. Biol. Lett. 2005;1:17-20

biology letters

Inbreeding depression

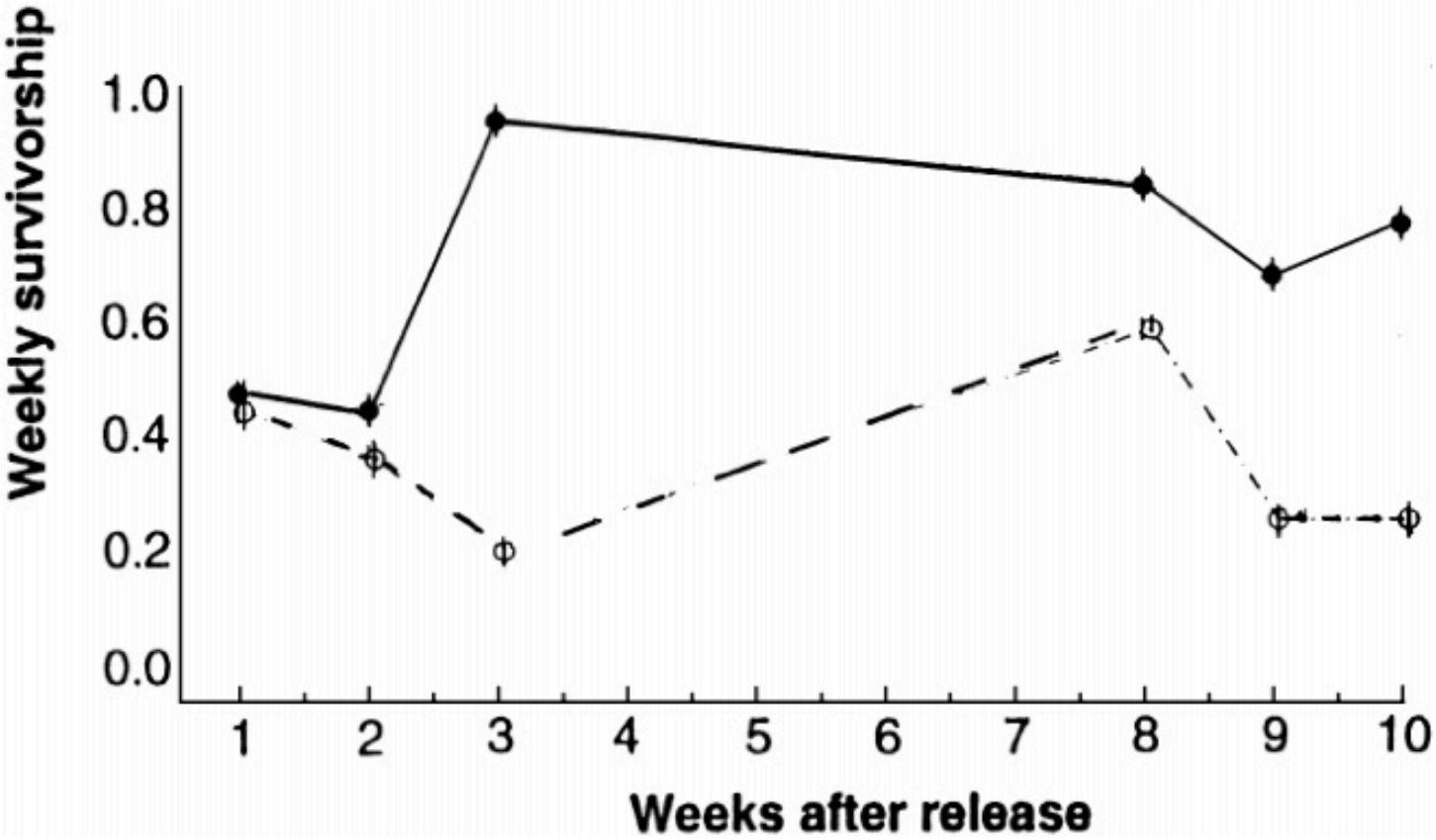
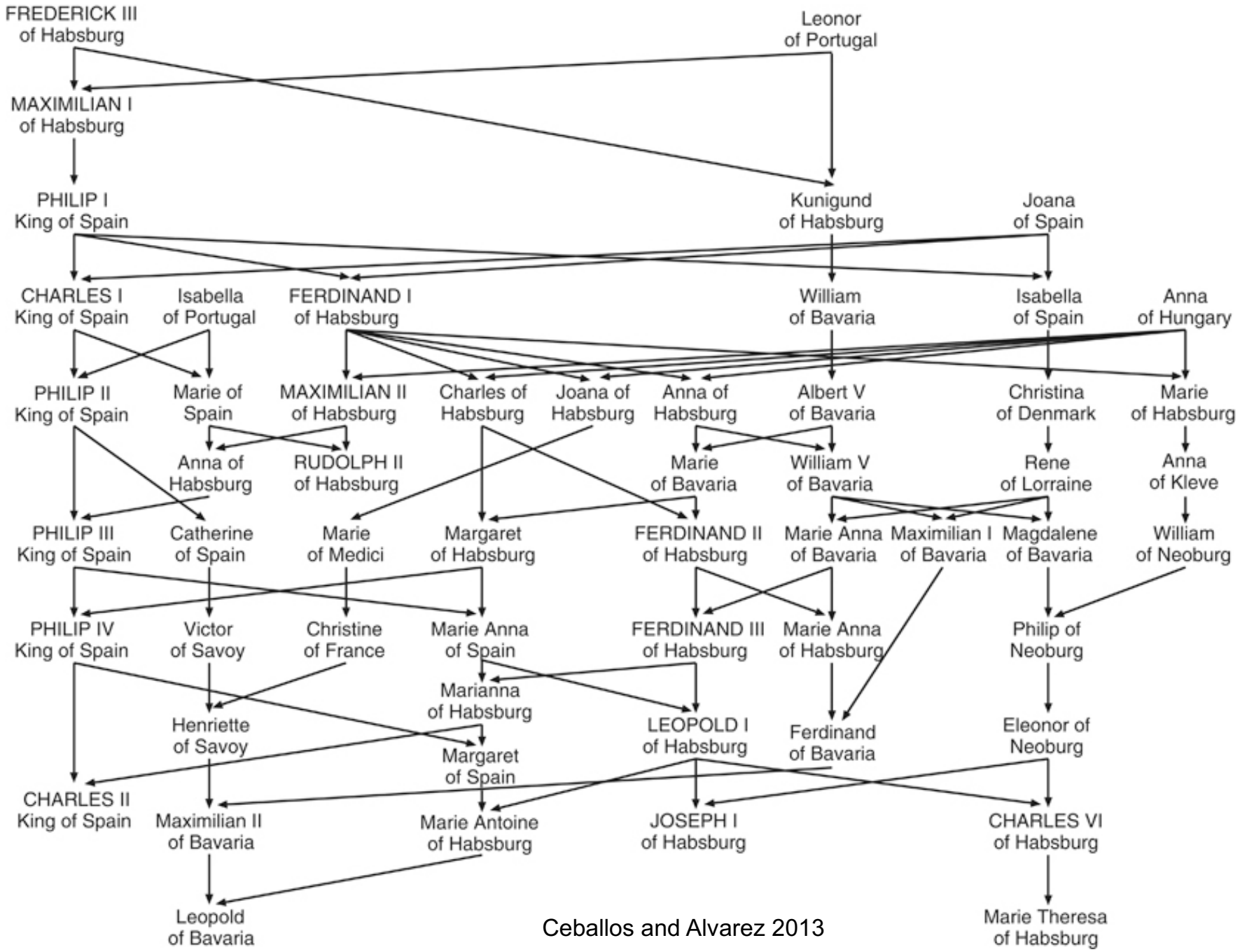


Figure 1 Weekly survivorship of non-inbred (solid line) and inbred (broken line) white footed mice over 10 weeks in a natural habitat (from 41).

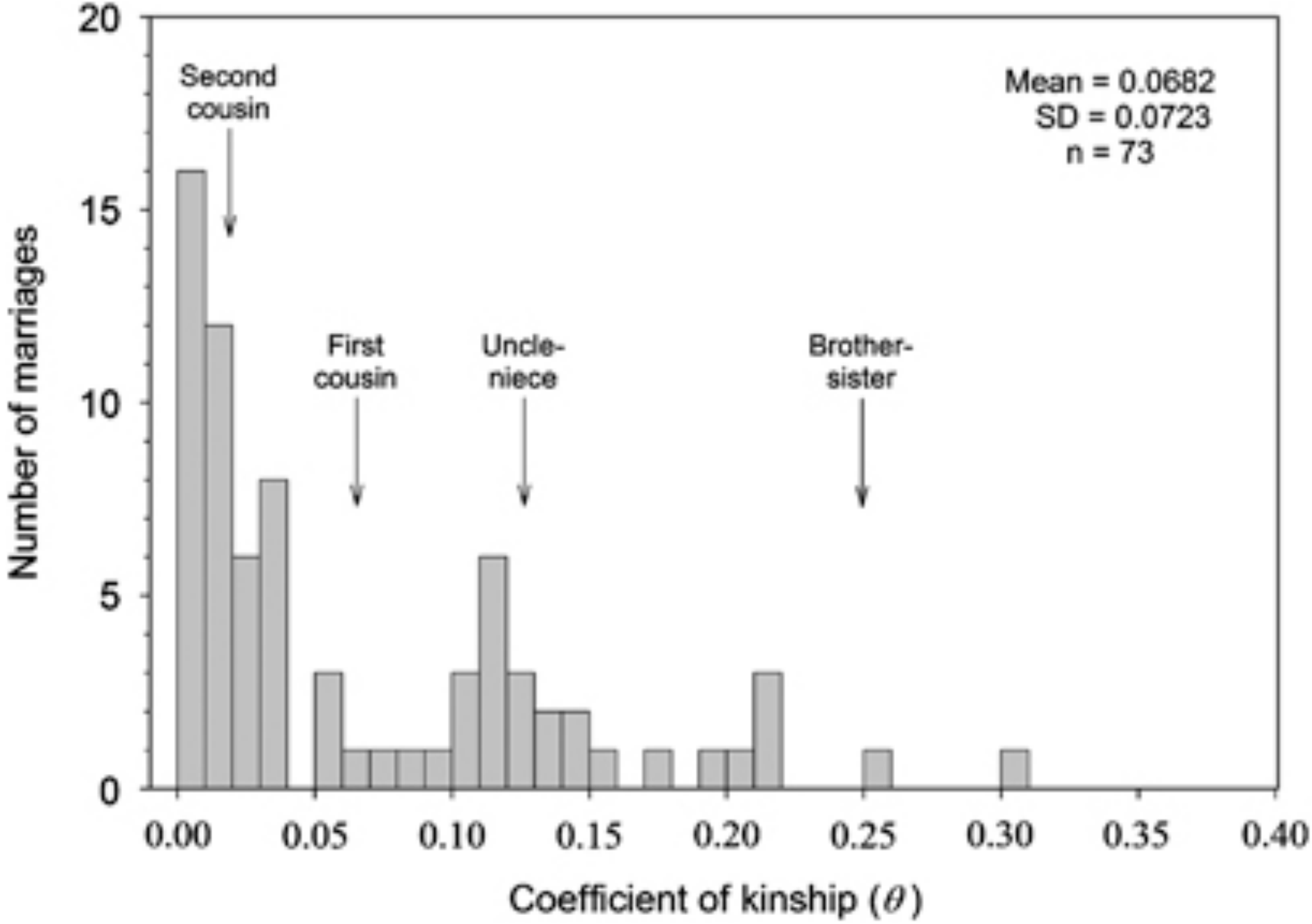
Jimenez et al. 1994

Inbreeding



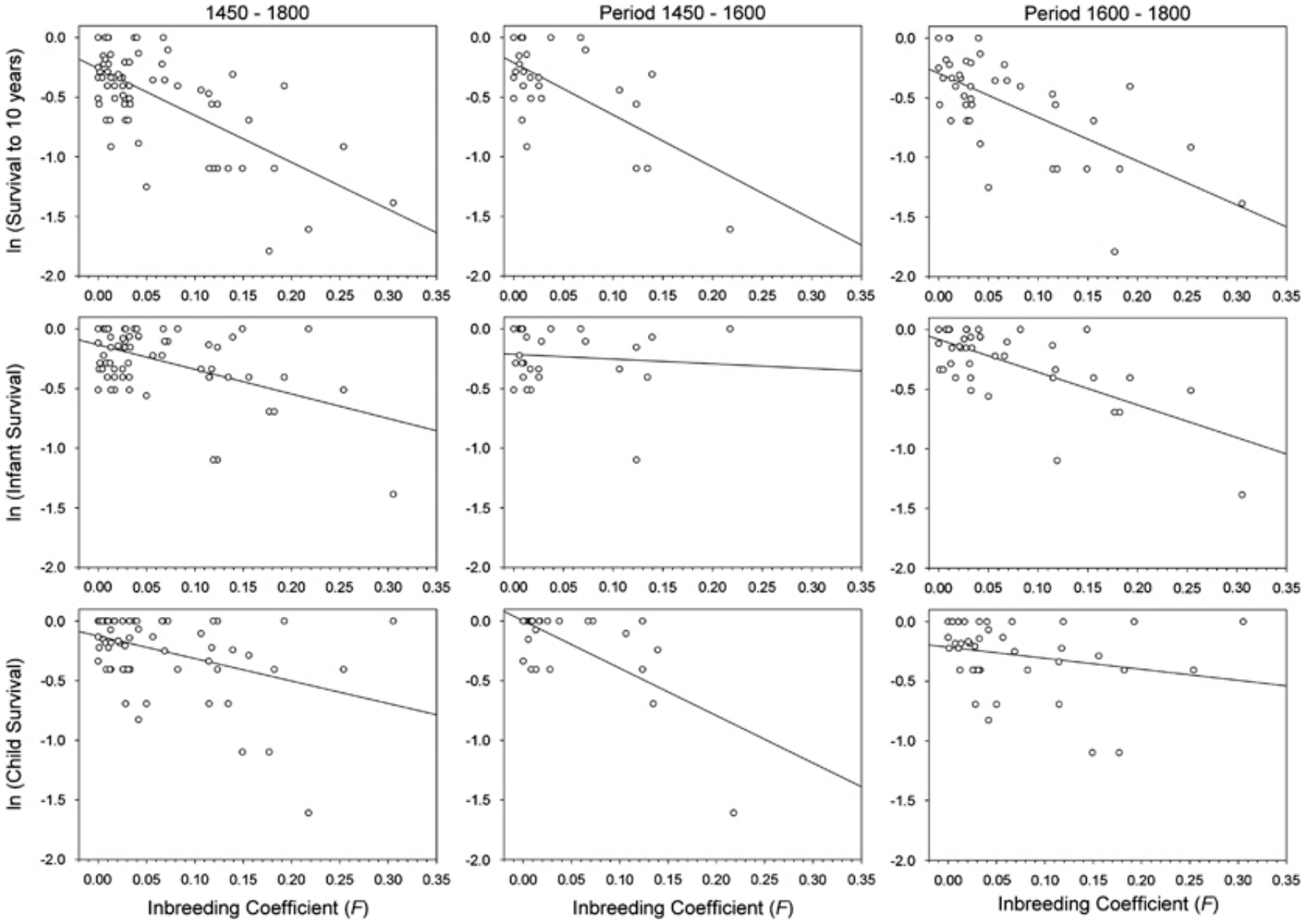
Ceballos and Alvarez 2013

Inbreeding



Ceballos and Alvarez 2013

Inbreeding



Ceballos and Alvarez 2013

Inbreeding depression

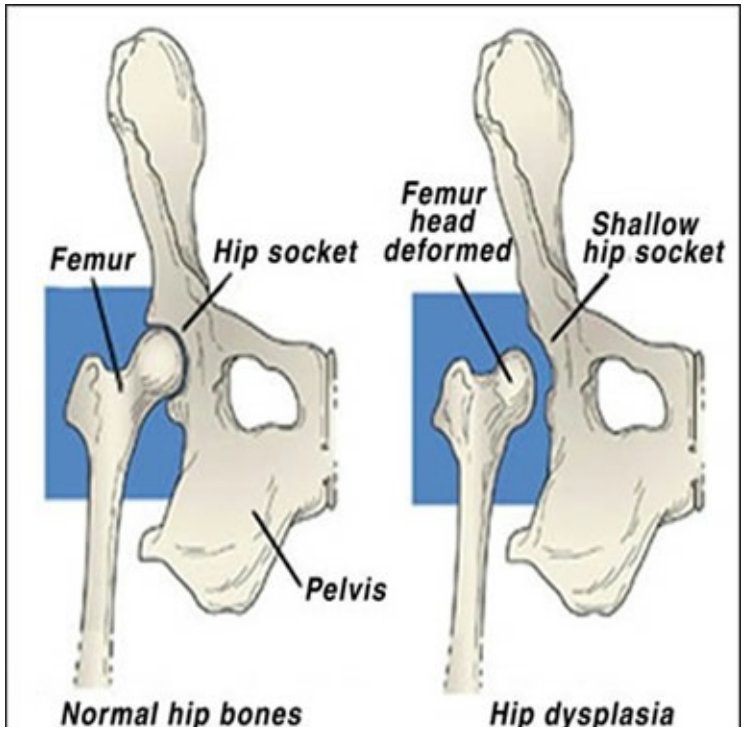


Table 1: Correlation values of different traits with inbreeding coefficient in tiger population

Traits	Correlation value	t-test value
Birth weight	-0.48447	0.48447
Age at first calving	0.142821	0.721499
Age at first mating	0.141793	0.716199
Parity	-0.22267	1.14201
Total number of cubs born in life time	-0.13914	2.48959*
Total number of cubs live upto weaning period	-0.217848	3.9673*
Age at death	-0.29715	5.26559*
Litter size	0.241375	4.599642*
Number of white cubs born in life time	-0.03921	0.69538
Number of normal cubs born in life time	-0.02057	0.36452
Gestation period	0.065128	0.32633
Sex ratio	0.040916	0.204749
Average interparturition period	0.048503	0.242803