***Inbreeding depression in male reproductive traits***

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29 data files overall that are linked to the findings of this study; ‘.csv’ format and an Rscript file

**1) Filename:**  **Balanced\_Corr\_Gens\_Female Elytra Length.csv**

Dataset describing father-daughter elytra length (proxy for body size) measurements (in μm) between generation through inbreeding to calculate heritability.

Column A: Corr\_Gen

Correlations between generations

Column B: Fam.ID

Replicate family identification

Column C: EL1\_mm

Elytra length of the parental generation in ‘mm’

Column D: EL2\_mm

Elytra length of the daughter generation in ‘mm’

Column E: EL1

Elytra length of the parental generation in ‘μm’

Column F: EL2

Elytra length of the daughter generation in ‘μm’

Column G: ID

sex of the individual; female

**2) Filename:**  **Balanced\_Corr\_Gens\_Female Longevity.csv**

Dataset describing father-daughter lifespan (in weeks) between generation through inbreeding to calculate heritability.

Column A: Corr\_Gen

Correlations between generations

Column B: Fam.ID

Replicate family identification

Column C: Age1\_weeks

Lifespan in (weeks) female 1 (mother)

Column D: Age2\_weeks

Lifespan in (weeks) female 2 (daughter)

Both female 1 and 2 are related

Column E: ID

sex of the individual; female

**3) Filename:**  **Balanced\_Corr\_Gens\_Male Elytra Length.csv**

Dataset describing father-son elytra length (proxy for body size) measurements (in μm) between generation through inbreeding to calculate heritability.

Column A: Corr\_Gen

Correlations between generations

Column B: Fam.ID

Replicate family identification

Column C: EL1\_mm

Elytra length of the parental generation in ‘mm’

Column D: EL2\_mm

Elytra length of the son generation in ‘mm’

Column E: EL1

Elytra length of the parental generation in ‘μm’

Column F: EL2

Elytra length of the son generation in ‘μm’

Column G: ID

sex of the individual; male

**4) Filename:**  **Balanced\_Corr\_Gens\_Male Longevity.csv**

Dataset describing father-son lifespan (in weeks) between generation through inbreeding to calculate heritability.

Column A: Corr\_Gen

Correlations between generations

Column B: Fam.ID

Replicate family identification

Column C: Age1\_weeks

Lifespan in (weeks) male 1 (father)

Column D: Age2\_weeks

Lifespan in (weeks) male 2 (son)

Both male 1 and 2 are related

Column E: ID

sex of the individual; male

**5) Filename: Balanced\_Corr\_Gens\_Offspring Productivity.csv**

Dataset describing reproductive output (offspring counts, over 7 days of oviposition) of parental generation against the offspring generation through inbreeding to calculate heritability.

Column A: Corr\_Gen

Correlations between generations

Column B: Fam.ID

Replicate family identification

Column C: Ofs1 (counts)

Offspring produced by a pair in the parental generation

Column D: Ofs1 (counts)

Offspring produced by a pair in the offspring generation

**6) Filename: Balanced\_Corr\_Gens\_Sperm Length.csv**

Dataset describing total sperm length (μm) of parental generation against the offspring generation through inbreeding to calculate heritability.

Column A: Corr\_Gen

Correlations between generations

Column B: Fam.ID

Replicate family identification

Column C: SL1 (μm)

Sperm length measured in the parental generation

Column D: SL2 (μm)

Sperm length measured in the offspring generation

**7) Filename: Balanced\_Corr\_Gens\_Testes Volume.csv**

Dataset describing testes volume (mm3 and μm3) of parental generation against the offspring generation through inbreeding to calculate heritability.

Column A: Corr\_Gen

Correlations between generations

Column B: Fam.ID

Replicate family identification

Column C: TV1\_mm

Testes volume measured (mm3) in the parental generation

Column D: TV1\_mm

Testes volume measured (mm3) in the offspring generation

Column E: TV1 (μm3)

Testes volume measured (μm3) in the parental generation

Column E: TV1 (μm3)

Testes volume measured (μm3) in the offspring generation

**8) Filename: Balanced\_Inbreeding\_Elytra.csv**

Dataset describing Male elytra length (mm) through inbreeding.

Column A: Family

Replicate, independent families that were randomly numbered at the start

Column B: ID

Inbreeding generation

Column C: Elytra

Elytra length measured (mm)

**9) Filename: Balanced\_Inbreeding\_Sperm length by family.csv**

Dataset describing Total sperm length (μm) through inbreeding by family.

Column A: Treatment

Generation ID

Column B: Fam.ID

Random family ID

Column C: Sperm\_length (μm)

Total sperm length measured (mm) by family, across generations

**10) Filename: Balanced\_Offpsring productivity March 2018.csv**

Dataset describing reproductive output over seven days (proxy for offspring produced, counts) through inbreeding by family.

Column A: Family

Random family ID

Column B: ID

Generation ID

Column C: Offspring

Counts- offspring produced over 7 days across generations

**11) Filename: Balanced\_Sperm Length Variance\_Dec2023.csv**

Dataset describing total sperm length through inbreeding and by individual sperm measured per male.

Column A: Gen

Generation ID

Column B: Family.ID

Random family ID

Column C: Sperm\_ID

Individual sperm measured

Column D: Sperm\_length

Sperm length measured (μm)

Column E: Unit

Units for measuring the sperm; ‘micrometer’

**12) Filename: Balanced\_Testes Follicle Variance.csv**

Dataset describing testes volumes through inbreeding and by measuring individual follicles per male.

Column A: Gen

Generation ID

Column B: Family

Random family ID

Column C: follicle.count

Number of testes follicles measured per male (maximum of 12 per male)

Column D: TV.follicles.mm3

Testes follicles measured to calculate testes volume (mm3)

Column E: TV.follicles.microns

Testes follicles measured to calculate testes volume (μm3)

**13) Filename: Balanced\_Testes Volume March 2018.csv**

Dataset describing testes volumes through inbreeding and by measuring individual male by combining follicle level information.

Column A: Family

Family ID

Column B: ID

Generation ID

Column C: Testes\_vol\_mm

Testes volume measured per male (mm3)

Column D: Testes\_vol

Testes volume measured per male (μm3)

**14) Filename: Balanced\_Testes Volume Variance\_Dec2023.csv**

Dataset describing variance in testes volumes through inbreeding combined by families.

Column A: Gen

Generation ID

Column B: TV.var

Variance in testes volumes

Column C: TV

Average testes volume measured per male (μm3)

**15) Filename: Extinctions.csv**

Dataset describing small family extinctions through inbreeding.

Column A: Gen

Generation ID

Column B: Extinctions

Number of extinctions (counts)

**16) Filename: G0\_G7\_Elytra\_Male\_Female comparisons.csv**

Dataset describing elytra length (mm and μm) changes in the extant families that were not inbred at generation 0 and generation 7 in both males and females.

Column A: Sex

Sex ID (male/female)

Column B: Family

Family ID

Column C: ID

Generation ID

Column D: Elytra\_mm

Elytra length (mm) by family across inbreeding generations

Column D: Elytra

Elytra length (μm) by family across inbreeding generations

**17) Filename: G0\_G7\_RO comparisons.csv**

Dataset describing reproductive output (offspring count) changes in the extant families that were not inbred at generation 0 and generation 7.

Column A: Family

Family ID (independent)

Column B: ID

Generation ID

Column C: Offspring

Reproductive output over 7 days

**18) Filename: G0\_G7\_SL comparisons.csv**

Dataset describing total sperm length (μm) changes in the extant families that were not inbred at generation 0 and generation 7.

Column A: Gen

Generation ID

Column B: Family.ID

Family ID (independent)

Column C: Sperm\_ID

ID of individual sperm measured in μm

Column D: SL

Total sperm length measured in μm

**19) Filename: G0\_G7\_TV comparisons.csv**

Dataset describing testes volume (mm3/μm3) changes in the extant families that were not inbred at generation 0 and generation 7.

Column A: Family

Family ID (independent)

Column B: ID

Generation ID

Column C: Testes\_vol (mm3)

Testes volume per male/family measured in mm3

Column D: Testes\_vol\_microns (μm3)

Testes volume per male/family measured in μm3

**20) Filename:** Inbcoeff\_Balanced\_Inbreeding\_Elytra.csv

Dataset describing male, female elytra length (μm) changes in the extant families by calculating inbreeding coefficients plotted family wise.

Column A: Inb.coef

Inbreeding coefficient

Column B: Family

Family ID

Column C: ID

Generation ID

Column D: Elytra (μm)

Elytra length male, female measured in μm

Column E: Sex

Sex (nominal data); male or female

**21) Filename:** Inbcoeff\_Balanced\_Inbreeding\_Sperm length by family.csv

Dataset describing total sperm length (μm) changes in the extant families by calculating inbreeding coefficients plotted family wise.

Column A: Inb.coef

Inbreeding coefficient

Column B: Treatment

Generation ID

Column C: Fam.ID

Family ID (independent)

Column D: Sperm\_length (μm)

Total sperm length measured in μm

Column E: Trait

Nominal data (Sperm\_Length)

**22) Filename:** Inbcoeff\_Balanced\_Offpsring productivity March 2018.csv

Dataset describing reproductive output (proxy for offspring counts) changes in the extant families by calculating inbreeding coefficients plotted family wise.

Column A: Inb.coef

Inbreeding coefficient

Column B: Family

Family ID (independent)

Column C: ID

Generation ID

Column D: Offspring (counts)

Reproductive output (proxy for offspring counts)

**23) Filename:** Inbcoeff\_Balanced\_Testes Volume March 2018.csv

Dataset describing testes volume (mm3, μm3) changes in the extant families by calculating inbreeding coefficients plotted family wise.

Column A: Inb.coef

Inbreeding coefficient

Column B: Family

Family ID (independent)

Column C: ID

Generation ID

Column D: Testes\_vol\_mm (mm3)

Testes volume measured in mm3

Column E: Testes\_vol (μm3)

Testes volume measured in μm3

**24) Filename:** Inbcoeff\_Extinctions.csv

Dataset describing number of families going extinct through the inbreeding protocol, represented by inbreeding coefficients.

Column A: Inb.coef

Inbreeding coefficient

Column B: Gen

Generation ID

Column C: Extinctions

Number of families going extinct (counts)

**25) Filename:** Inbcoeff\_Within and between family variance Lifespan.csv

Dataset describing lifespan of males, females (in weeks) through the inbreeding protocol, represented by inbreeding coefficients.

Column A: Sex

Male or female (nominal)

Column B: Fam.ID

Family ID

Column C: Rep.ID

Replicate family ID (within a family)

Column D: Lifespan (in weeks)

Lifespan measured in weeks

Column E: Status (1= alive; 0 = dead)

Live or dead, binomial code

Column F: Gen

Generation ID

Column G: Inb.coef

Inbreeding coefficient (fixed)

**26) Filename:** Inbreeding\_Elytra.csv

Dataset describing male, female (in mm, μm) body size through the inbreeding assay by family.

Column A: Sex

Male or female (nominal)

Column B: Family

Family ID

Column C: ID

Generation ID

Column D: Elytra\_mm (in mm)

Elytra length measured in ‘mm’

Column E: Elytra (in μm)

Elytra length measured in ‘μm’

**27) Filename:** SL\_zscores.csv

Dataset describing total sperm length (in μm) and z-scores through the inbreeding assay by family

Column A: Inb.coef

Column B: Treatment

Generation ID

Column C: Fam.ID

Family ID (independent)

Column D: Sperm\_length (in μm)

Total sperm length measured in ‘μm’

Column E: Trait

Sperm\_Length

Column E: zscore

z-scores calculated for sperm length for normalizing the distribution

**28) Filename:** Within and between family variance Lifespan.csv

Dataset describing lifespan (in weeks) variance by sex, family-level through the inbreeding assay.

Column A: Sex

Male or female (nominal)

Column B: Fam.ID

Family ID

Column C: Rep.ID

Replicate nested within each family, two levels A and B

Column D: Lifespan (in weeks)

Lifespan measured in weeks

Column E: Status

1= Alive; 0= Dead (binomial data)

Column E: Gen

Generation ID

**28) Filename:** Within and between family variance Reproductive output.csv

Dataset describing family level reproductive output (proxy for offspring counts) by family-level through the inbreeding assay. Replicate paired families are present only from the first round of inbreeding prior to that it was the outbred, Gen.0, that was taken directly from the stocks.

Column A: Family.ID

Family Identification, random ID at the start of the experiment

Column B: Rep.Fam

Replicate family ID (either A or B), randomly assigned, not independent as they are from the same family

Column C: Gen

Generation ID

Column D: Off.counts (reproductive output, counts proxy for offspring produced)

Family-level reproductive output, proxy for offspring count