**Supplementary material: High inter-generational individual quality in yellow-eyed penguins**

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All statistical analyses were carried out using R (Version 3.3.0, R Core Team 2016). The data file “LRSSUMMARY.csv” is a summary of the lifetime reproductive success, life-history, offspring and grand-offspring of 217 sexed yellow-eyed penguins with complete life-histories.

**Statistical analyses**

Wilcoxon Rank-Sum tests were used to test for differences between male and female yellow-eyed penguins for each of the life-history parameters considered (lifetime reproductive success, LRS; Age at first breeding; Lifespan; Breeding lifespan; total number of mates; total number of first-generation offspring to survive juvenile year; total number of first-generation offspring to attempt breeding; total number of first-generation offspring to breed successfully; total number of breeding attempts). The function *wilcox.test* from the package *stats* was used (R Core Team 2016):

wilcox.test(LRS[SEX=="F"], y = LRS[SEX=="M"], alternative= "two.sided", conf.level=0.95)

wilcox.test(AGEATFIRSTBREEDING[SEX=="F"], y = AGEATFIRSTBREEDING[SEX=="M"], alternative= "two.sided", conf.level=0.95)

wilcox.test(LIFESPAN[SEX=="F"], y = LIFESPAN[SEX=="M"], alternative= "two.sided", conf.level=0.95)

wilcox.test(BREEDINGLIFESPAN[SEX=="F"], y =BREEDINGLIFESPAN[SEX=="M"], alternative= "two.sided", conf.level=0.95)

wilcox.test(TOTALMATES[SEX=="F"], y = TOTALMATES[SEX=="M"], alternative= "two.sided", conf.level=0.95)

wilcox.test(SURVIVINGJUVENILES[SEX=="F"], y = SURVIVINGJUVENILES[SEX=="M"], alternative= "two.sided", conf.level=0.95)

wilcox.test(BREEDINGOFFSPRING[SEX=="F"], y = BREEDINGOFFSPRING[SEX=="M"], alternative= "two.sided", conf.level=0.95)

wilcox.test(SUCCESSFULBREEDINGOFFSPRING[SEX=="F"], y = SUCCESSFULBREEDINGOFFSPRING[SEX=="M"], alternative= "two.sided", conf.level=0.95)

wilcox.test(TOTALNOBREEDINGATTEMPTS[SEX=="F"], y = TOTALNOBREEDINGATTEMPTS[SEX=="M"], alternative= "two.sided", conf.level=0.95)

Generalised linear models (GLM) were used to construct a maximal model to explain the variation in lifetime reproductive success of yellow-eyed penguins using life-history parameters and sex. All life-history parameters were z-transformed using the function *scale* from the package *base* (R Core Team 2016). As these data were overdispersed, we used a quasi-Poisson distribution, using a function to return log likelihoods for QAICc (“x.quasipoisson”, after R For Fish and Wildlife Grads 2016). We used the functions *dredge*, *get.models*, *model.avg* from the package *MuMIn* (Bartoń 2015) and the function *confint* from the package *stats* (R Core Team 2016) to simplify model selection and multi-model inference with our *a priori* selected input variables:

x.quasipoisson<-function(){

res<-quasipoisson()

res$aic<-poisson()$aic

res

}

GLM1<-glm(LRS ~ zLIFESPAN + zAGEATFIRSTBREEDING + zTOTALMATES + factor(SEX) + factor(SEX):zAGEATFIRSTBREEDING + factor(SEX):zLIFESPAN, data=Data, family= x.quasipoisson)

chat<-sum(residuals(GLM1, "pearson")^2)/GLM1$df.residual

options(na.action = "na.fail")

DREDGEDMODELSET<-dredge(GLM1, beta= "none", evaluate = TRUE, rank = QAICc, chat=chat)

options(na.action = "na.omit")

BESTMODELS<-get.models(DREDGEDMODELSET, subset = delta<2)

BESTMODELSET<-model.avg(BESTMODELS)

summary(BESTMODELSET)

confint(BESTMODELSET)

A similar approach was used to explain the variation in breeder type as described above, with the maximal model being of the form:

GLM2<-glm(LRS ~ zLIFESPAN + zAGEATFIRSTBREEDING + zTOTALMATES + factor(BREEDERTYPE) + factor(BREEDERTYPE):zAGEATFIRSTBREEDING + factor(BREEDERTYPE):zLIFESPAN, data=Data, family= x.quasipoisson)

**References:**

Bartoń K, 2016. MuMIn: Multi-Model Inference. R package version 1.15.6. https://CRAN.R-project.org/package=MuMIn.

R Core Team, 2016. R: A language and environment for statistical computing. R Foundation for Statistical Computing, Vienna, Austria. URL https://www.R-project.org/.

R for Fish and Wildlife Grads, 2016. Accessed 10 August 2016. Website: https://sites.google.com/site/rforfishandwildlifegrads/home/mumin\_usage\_examples