Including all data (males and females)

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **Surv(age, status)** | | | **Surv(age, status)** | | | **Surv(age, status)** | | | **Surv(age, status)** | | |
| *Predictors* | *Estimates* | *CI* | *p* | *Estimates* | *CI* | *p* | *Estimates* | *CI* | *p* | *Estimates* | *CI* | *p* |
| L [DR] | 0.88 | 0.79 – 0.97 | **<0.001** | 0.87 | 0.79 – 0.97 | **<0.001** | 0.87 | 0.76 – 0.98 | **<0.001** | 0.88 | 0.76 – 1.02 | 0.084 |
| A [DR] | 0.74 | 0.66 – 0.82 | **<0.001** | 0.75 | 0.67 – 0.84 | **<0.001** | 0.93 | 0.83 – 1.05 | 0.388 | 0.76 | 0.65 – 0.89 | **<0.001** |
| sex [M] | 0.66 | 0.61 – 0.71 | **<0.001** |  |  |  |  |  |  |  |  |  |
| L [DR] \* A [DR] | 1.17 | 1.01 – 1.36 | 0.106 | 1.18 | 1.02 – 1.36 | 0.099 |  |  |  | 1.14 | 0.92 – 1.41 | 0.237 |
| larv\_adult [C\_DR] |  |  |  |  |  |  | 0.81 | 0.67 – 0.97 | **0.033** |  |  |  |
| larv\_adult [C\_DR] \* sexM |  |  |  |  |  |  | 0.97 | 0.77 – 1.21 | 0.225 |  |  |  |
| larv\_adult [DR\_C] \* sexM |  |  |  |  |  |  | 1.02 | 0.83 – 1.27 | 0.179 |  |  |  |
| larv\_adult [DR\_DR] \* sexM |  |  |  |  |  |  | 0.86 | 0.69 – 1.08 | **<0.001** |  |  |  |
| N |  | | |  | | |  | | | 8 C | | |
| Observations | 3132 | | | 3132 | | | 3132 | | | 3132 | | |
| R2 Nagelkerke | 0.048 | | | 0.011 | | | 0.012 | | | NA | | |

mod1.0 <- coxph(Surv(age, status) ~ L + A +

L\*A + sex + c(C), data = eelife)

> cox.zph(mod1.0) # very NPH

L 4.42591 1 0.03540

A 0.00175 1 0.96665

sex 17.62302 1 2.7e-05

L:A 2.16200 1 0.14146

GLOBAL 21.34312 4 0.00027

mod1.1 <- coxph(Surv(age, status) ~ L + A +

L\*A + s(sex) + c(C), data = eelife)

> cox.zph(mod1.1) # PH

chisq df p

L 2.776 1 0.096

A 0.827 1 0.363

L:A 2.970 1 0.085

GLOBAL 3.870 3 0.276

> aictab(list(mod1.0,mod1.1,mod1.2))

Model selection based on AICc:

K AICc Delta\_AICc AICcWt Cum.Wt LL

Mod2 3 37439.54 0.00 0.97 0.97 -18716.77

Mod3 8 37446.56 7.02 0.03 1.00 -18715.26

Mod1 4 41142.83 3703.29 0.00 1.00 -20567.41

Notes

# mod1.1 is best (AICcWt=0.99)

# Although larv\_adultDR\_DR:s(sex)M is (\*\*\*), mod1.2 is bad (AICcWt=0.01)

# Even when L\*A is removed, mod1.2 is AICcWt=0.03

# We can conclude absence of sex-by-diet interaction, generally.

mod1.3 <- coxme(Surv(age, status) ~ L + A +

L\*A + s(sex) + (1 | C), data = eelife)

> anova(mod1.1, mod1.3)

Analysis of Deviance Table

Cox model: response is Surv(age, status)

Model 1: ~L + A + s(sex) + L:A

Model 2: ~L + A + L \* A + s(sex) + (1 | C)

loglik Chisq Df P(>|Chi|)

1 -18717

2 -18716 2.0336 1 0.1539

Notes

# C can be ignored

# Note: mod1.1 and mod1.3 are the same (i.e. c(C for coxph

# is same as (1 | C for coxme)))

# So, interpret mod1.1

SEPARATE SEXES

mod2.0 <- coxph(Surv(age, status) ~ L + A +

L\*A + c(C),

data = eelifeF)

summary(mod2.0)

cox.zph(mod2.0) # NPH

coef(mod2.0)

mod2.1 <- coxph(Surv(age, status) ~ L + s(A) +

L\*A + c(C), data = eelifeF)

summary(mod2.1)

cox.zph(mod2.1) # PH

# Looks good

mod2.2 <- coxph(Surv(age, status) ~ L + s(A) +

L\*A, data = eelifeF)

summary(mod2.2)

cox.zph(mod2.2) # PH

mod2.3 <- coxph(Surv(age, status) ~ L + s(A),

data = eelifeF)

summary(mod2.3)

cox.zph(mod2.3) # PH

aictab(list(mod2.0,mod2.1, mod2.2, mod2.3))

Model selection based on AICc:

K AICc Delta\_AICc AICcWt Cum.Wt LL

Mod2 3 21895.25 0.00 0.38 0.38 -10944.62

Mod3 3 21895.25 0.00 0.38 0.77 -10944.62

Mod4 1 21896.25 1.00 0.23 1.00 -10947.12

Mod1 3 24419.01 2523.76 0.00 1.00 -12206.50

Notes

# Model mod2.1 ties with mod2.2, and are both not so diff from mod2.3

# Support to ignore cage

# Suggest the larv\*adult interaction not so important

Females only

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **Surv(age, status)** | | | **Surv(age, status)** | | | **Surv(age, status)** | | | **Surv(age, status)** | | |
| *Predictors* | *Estimates* | *CI* | *p* | *Estimates* | *CI* | *p* | *Estimates* | *CI* | *p* | *Estimates* | *CI* | *p* |
| L [DR] | 0.87 | 0.76 – 0.98 | **<0.001** | 0.87 | 0.77 – 0.99 | **<0.001** | 0.87 | 0.77 – 0.99 | **0.032** | 0.96 | 0.88 – 1.06 | 0.414 |
| A [DR] | 0.76 | 0.66 – 0.87 | **<0.001** |  |  |  |  |  |  |  |  |  |
| L [DR] \* A [DR] | 1.24 | 1.03 – 1.49 | **0.033** | 1.24 | 1.03 – 1.49 | **0.035** | 1.24 | 1.03 – 1.49 | **0.025** |  |  |  |
| Observations | 1954 | | | 1954 | | | 1954 | | | 1954 | | |
| R2 Nagelkerke | 0.009 | | | 0.003 | | | 0.003 | | | 0.000 | | |

mod2.0 <- coxph(Surv(age, status) ~ L + A +

L\*A + c(C),

data = eelifeF)

> cox.zph(mod2.0) # NPH

chisq df p

L 0.459 1 0.49815

A 12.982 1 0.00031

L:A 5.095 1 0.02400

GLOBAL 14.284 3 0.00254

mod2.1 <- coxph(Surv(age, status) ~ L + s(A) +

L\*A + c(C), data = eelifeF)

> cox.zph(mod2.1) # PH

chisq df p

L 0.87780 1 0.35

L:A 0.00215 1 0.96

GLOBAL 1.80914 2 0.40

mod2.2 <- coxph(Surv(age, status) ~ L + s(A) +

L\*A, data = eelifeF)

> cox.zph(mod2.2) # PH

chisq df p

L 0.87780 1 0.35

L:A 0.00215 1 0.96

GLOBAL 1.80914 2 0.40

mod2.3 <- coxph(Surv(age, status) ~ L + s(A),

data = eelifeF)

> cox.zph(mod2.3) # PH

chisq df p

L 1.46 1 0.23

GLOBAL 1.46 1 0.23

> aictab(list(mod2.0, mod2.1, mod2.2, mod2.3))

Model selection based on AICc:

K AICc Delta\_AICc AICcWt Cum.Wt LL

Mod2 3 21895.25 0.00 0.38 0.38 -10944.62

Mod3 3 21895.25 0.00 0.38 0.77 -10944.62

Mod4 1 21896.25 1.00 0.23 1.00 -10947.12

Mod1 3 24419.01 2523.76 0.00 1.00 -12206.50

Notes

# Model mod2.1 ties with mod2.2, and are both not so diff from mod2.3

# Support to ignore cage

# Suggest the larv\*adult interaction not so important

Males only

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **Surv(age, status)** | | | **Surv(age, status)** | | | **Surv(age, status)** | | | **Surv(age, status)** | | |
| *Predictors* | *Estimates* | *CI* | *p* | *Estimates* | *CI* | *p* | *Estimates* | *CI* | *p* | *Estimates* | *CI* | *p* |
| L [DR] | 0.89 | 0.75 – 1.06 | **0.002** | 0.90 | 0.75 – 1.07 | **0.006** | 0.90 | 0.75 – 1.07 | 0.236 | 0.92 | 0.82 – 1.04 | 0.193 |
| A [DR] | 0.73 | 0.61 – 0.87 | **<0.001** |  |  |  |  |  |  |  |  |  |
| L [DR] \* A [DR] | 1.07 | 0.84 – 1.37 | 0.457 | 1.05 | 0.82 – 1.34 | 0.590 | 1.05 | 0.82 – 1.34 | 0.690 |  |  |  |
| Observations | 1178 | | | 1178 | | | 1178 | | | 1178 | | |
| R2 Nagelkerke | 0.017 | | | 0.002 | | | 0.002 | | | 0.001 | | |

mod3.0 <- coxph(Surv(age, status) ~ L + A +

L\*A + c(C),

data = eelifeM)

> cox.zph(mod3.0) # NPH

chisq df p

L 4.144 1 0.0418

A 10.397 1 0.0013

L:A 0.135 1 0.7131

GLOBAL 14.931 3 0.0019

mod3.1 <- coxph(Surv(age, status) ~ L + s(A) +

L\*A + c(C),

data = eelifeM)

> cox.zph(mod3.1) # NPH

chisq df p

L 3.43 1 0.064

L:A 4.32 1 0.038

GLOBAL 4.48 2 0.106

mod3.2 <- coxph(Surv(age, status) ~ L + s(A) +

L\*A, data = eelifeM)

> cox.zph(mod3.2) # NPH

chisq df p

L 3.43 1 0.064

L:A 4.32 1 0.038

GLOBAL 4.48 2 0.106

mod3.3 <- coxph(Surv(age, status) ~ L + s(A),

data = eelifeM)

> cox.zph(mod3.3) # PH

chisq df p

L 3.55 1 0.06

GLOBAL 3.55 1 0.06

> aictab(list(mod3.0,mod3.1, mod3.2,mod3.3))

Model selection based on AICc:

K AICc Delta\_AICc AICcWt Cum.Wt LL

Mod4 1 11577.03 0.00 0.77 0.77 -5787.51

Mod2 3 11580.89 3.86 0.11 0.89 -5787.43

Mod3 3 11580.89 3.86 0.11 1.00 -5787.43

Mod1 3 13023.54 1446.51 0.00 1.00 -6508.76

Notes

# The simplest model mod3.3 seems best (Wt 0.77)

# Mods 3.1 and 3.2 tie with Wt 0.11 - again suggesting cage can be ignored

# Larval-adult diet interaction not important for males

# Interpret the simplest mod