**Growth chronology model selection:**

1. Selection of the best Random structure.

Table 1. Random structure selection. Best supported model based on ΔAICc (difference in Akaike’s information criterion corrected for small sample sizes) are highlighted in bold. df=degrees of freedom; LL=log likelihood; $R^{2}C$= Conditional R square; $R^{2}M$= Marginal R square. M1a: random intercept for FishID; M1b random slope and intercept model FishID and Age; M2a: random slope and intercept for FishID and Age, and random intercept for Year; M2b: random slope and intercept for FishID and Age, and random intercept for Cohort.

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| --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |  |  |
| Grupo 1 | **random effect** | **df** | **AICc** | **ΔAICc** | **AICcWt** | **Cum.Wt** | **Res.LL** |
| M2a | **(log(age)|FishID) + (1|fYear)** | **8** | **-143.84** | **0** | **0.88** | **0.88** | **80.13** |
| M2b | (log(age))|FishID) + (1|fCohort) | 8 | -123.86 | 19.98 | 0 | 1 | 70.14 |
| M1b | (log(age)|FishID) | 7 | -99.83 | 44.01 | 0 | 1 | 57.07 |
| M1a | (1|FishID) | 5 | -94.9 | 48.94 | 0 | 1 | 52.54 |
|  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |
| Grupo 2 | **random effect** | **df** | **AICc** | **ΔAICc** | **AICcWt** | **Cum.Wt** | **Res.LL** |
| M2a | **(log(age)|FishID) + (1|fYear)** | **8** | **-218.01** | **0** | **0.85** | **0.85** | **117.19** |
| M2b | (log(age))|FishID) + (1|fCohort) | 8 | -166.16 | 51.85 | 0 | 1 | 91.26 |
| M1b | (log(age)|FishID) | 7 | -157.39 | 60.62 | 0 | 1 | 85.84 |
| M1a | (1|FishID) | 5 | -139.71 | 78.3 | 0 | 1 | 74.93 |
|  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |
| Grupo 3 | **random effect** | **df** | **AICc** | **ΔAICc** | **AICcWt** | **Cum.Wt** | **Res.LL** |
| M2b | log(age))|FishID) + (1|fCohort) | 8 | -8.87 | 0 | 0.38 | 0.83 | 12.66 |
| M2a | **(log(age)|FishID) + (1|fYear)** | **8** | **-6.32** | **2.84** | **0.11** | **0.93** | **11.38** |
| M1b | (log(age)|FishID) | 7 | -2.88 | 6.28 | 0.02 | 1 | 8.61 |
| M1a | (1|FishID) | 5 | 9.92 | 19.07 | 0 | 1 | 0.13 |
|  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |
| All Groups | **random effect** | **df** | **AICc** | **ΔAICc** | **AICcWt** | **Cum.Wt** | **Res.LL** |
| M2a | **(log(age)|FishID) + (1|fYear)** | **-368.22** | **36.47** | **0** | **1** | **192.18** | **-368.22** |
| M2b | (log(age)|FishID) + (log(age)|fCohort) | 59.51 | 464.19 | 0 | 1 | -21.69 | 59.51 |
| M1b | (log(age)|FishID) | 67.55 | 472.24 | 0 | 1 | -26.72 | 67.55 |
| M1a | (1|FishID) | 268.73 | 673.41 | 0 | 1 | -129.34 | 268.73 |

\*Following the principle of maximum parsimony, the simples model were selected (i.e when **Δ**AICc < 3)

1. Selection of the best instrinsic structure.

Table 2. Intrinsic structure selection. Best supported model based on ΔAICc (difference in Akaike’s information criterion corrected for small sample sizes) are highlighted in bold. df=degrees of freedom; LL=log likelihood; $R^{2}C$ = Conditional Rsquare; $R^{2}M$ = Marginal R square. All models have the following random structure: random slope and intercept for FishID and Age, and random intercept for Year. And the extrinsic structure includes age in model M3A1 and age + age at capture (AAC) in model M3A2.

|  |
| --- |
| Intrinsic optimun model- Model selection based on AICc: |
|  | **intrinsic effect** |  |  |  |  |  |  |  |  |
| Group 1 | M3a1<- lmer (log(ring.measu) ~ c.(log(age)) + (c.(log(age))|FishID) + (1|fYear), G1, REML=F) |  |
|  |  | **df** | **AICc** | **ΔAICc** | **AICcWt** | **Cum.Wt** | **Res.LL** | $$R\_{M}^{2}$$ | $$R\_{C}^{2}$$ |
| M3a2 | age+AAC | 8 | -156.27 | 0 | 0.58 | 0.58 | 86.34 | 0.283 | 0.814 |
| M3a1 | **age** | 7 | -155.65 | 0.62 | 0.42 | 1 | 84.98 | **0.267** | **0.814** |
| Group 2 | lmer (log(ring.measu) ~ c.(log(age)) + c.(log(AAC)) + (c.(log(age))|FishID) + (1|fYear), G2, REML=F) |
|  |  | **df** | **AICc** | **ΔAICc** | **AICcWt** | **Cum.Wt** | **Res.LL** | $$R\_{M}^{2}$$ | $$R\_{C}^{2}$$ |
| M3a2 | **age+AAC** | **8** | **-228.58** | **0** | **0.82** | **0.82** | **122.47** | **0.182** | **0.876** |
| M3a1 | age | 7 | -225.57 | 3 | 0.18 | 1 | 119.93 | 0.144 | 0.873 |
|  |  |  |  |  |  |  |  |  |  |
| Group 3 | M3a1<- lmer (log(ring.measu) ~ c.(log(age)) + (c.(log(age))|FishID) + (1|fYear), G3, REML=F) |
|  |  | **df** | **AICc** | **ΔAICc** | **AICcWt** | **Cum.Wt** | **Res.LL** | $$R\_{M}^{2}$$ | $$R\_{C}^{2}$$ |
| M3a1 | **age** | **7** | **-16.67** | **0** | **0.69** | **0.69** | **15.51** | **0.380** | **0.891** |
| M3a2 | age+AAC | 8 | -15.03 | 1.65 | 0.31 | 1 | 15.73 | 0.397 | 0.894 |
|  |  |  |  |  |  |  |  |  |  |
| All Groups | M3a1<- lmer (log(ring.measu) ~ c.(log(age)) + (c.(log(age))|FishID) + (1|fYear), Full, REML=F) |
|  |  | **df** | **AICc** | **ΔAICc** | **AICcWt** | **Cum.Wt** | **Res.LL** | $$R\_{M}^{2}$$ | $$R\_{C}^{2}$$ |
| M3a1 | **age** | **7** | **-380.5** | **0** | **0.68** | **0.68** | **197.3** | **0.416** | **0.914** |
| M3a2 | age+AAC | 8 | -378.97 | 1.53 | 0.32 | 1 | 197.55 | 0.433 | 0.914 |

\*Following the principle of maximum parsimony, the simples model were selected (i.e when **Δ**AICc < 3)