Reorganizing and reducing DEB manuscript

Each line is a paragraph

Highlighted items have been moved to SI

**Introduction**

1. Worsening hypoxia and fish ELS – need for modeling
2. Physiological responses to hypoxia
3. Menidia menidia hypoxia responses, effects of global change on hypoxic duration
4. DEB theory and why it is useful
5. DEBkiss and how it is different
6. How to decide which DEB model to use
7. Summary of objectives and approach (synthesizing units)

**Methods**

1. DEBkiss Model Description
   1. Energy flows at each life stage
   2. Parameters and fluxes
   3. Maturity
   4. Starvation
   5. Conversions
   6. Survival
2. Data
   1. Types of data
   2. Total length data
   3. Egg buffer, survival, and egg production
3. Parameter estimation under normoxia
   1. Parameters estimated and optimization method
   2. Getting initial values, suggested values, and estimating parameters
   3. Calculating parameters from data
4. Relating DEB processes to physiology
   1. Introduce single-substrate SU and correction factor (2 citations)
   2. Inhibition and damage, and which parameters they would affect (1 citation)
   3. Assimilation inhibition through reduced food consumption (4 citations)
   4. Assimilation inhibition through binding of proteins controlled by Hifs (5 citations)
   5. Conversion efficiency damage through anaerobic byproducts (9 citations)
   6. Maintenance affected through damage repair and behavior (11 citations)
   7. Maintenance and respiration (1 citation)
   8. Mortality indirectly affected through developmental delay, damage, or lack of damage repair. And how mortality relates to hatch timing in this model. (0 citations)
      1. This might be the only one to stay in the main text because it relates to the model structure and hypothesized results. Unless just putting it in the discussion is enough?
5. Hypoxia effects
   1. Use of correction factor to fit to hypoxia data
   2. Noncompetitive inhibition and how we relate it to oxygen
   3. Qualitative description of shape of c~DO
   4. Damage correction factor
   5. Applying correction factor to each parameter
   6. Estimating Z through optimization, and which parameter combos we applied it to
   7. Using AIC to compare versions of the model

Discussion

1. Main finding – yVA is main mechanism responsible for hypoxia effects
2. yVA was slightly better at explaining the hypoxia effects than assimilation, and what the physiological reasons may be
3. JaAm and yVA could have both contributed in part, and how future work could test their relative contributions
4. Also needed to alter the mortality parameters; model didn’t capture enhanced larval mortality at lowest DO level
5. Maintenance was not responsible for hypoxia responses, and why we think that is
6. Utility for looking at population level, what is needed to do so
7. Implications of model in context of natural conditions and multistressor experimentation
8. More data would improve model, but even as is it is effective and widely applicable
9. Limitations in identifying physiological modes of action
10. Future work should integrate suborganismal data with DEBtox modeling