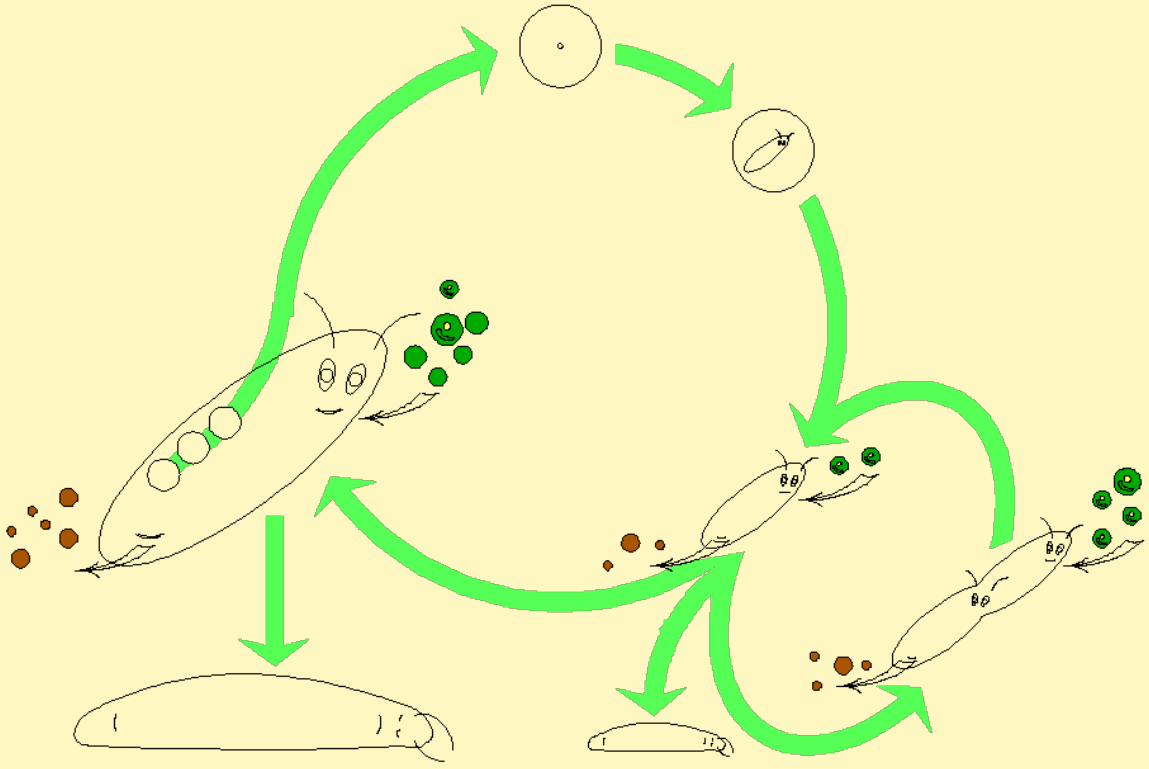
# Errata for

# Dynamic Energy Budget theory

## for metabolic organisation



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Numbers refer to section, page and line; a negative line number means line from bottom.

**1.1.2, {2}, 26** The ',' at the end of the sentence should be '.' (error spotted by Koji Tominaga)

**1.1.4, {6}, -6** 'size, size' should be 'size, age' (error spotted by Nina Marn)

**1.2.3, {11}, 8** The shape coefficient $\delta_{\mathcal{M}}$ converts shape-specific physical length to structural length: $L = \delta_{\mathcal{M}} L_w$.

**1.3.1, {19}, 24** *Scophthalmus maximum* must be *Scophthalmus maximus* (error spotted by Jaap van der Meer)

**1.3.8, {22}, -17** 'effected' must be 'affected' (error spotted by Matt Malishev)

**2, {24}, 16** 'volumetric length' must be 'structural (volumetric) length'

**2.1.4, {23}, 24** 'volumetric length' must be 'structural (volumetric) length'

**2.1.4, {33}, -4** Legends to Figure 2.6: the units of $X$ and $K$ are cells/ml, while the symbols indicate dimension C-mol per volume. It would have been more consistent to suppress the mentioning of the symbols (error spotted by Jaap van der Meer)

**2.1.4, {34}, 18** $t_b = \dot{h}^{-1}$ must be $t_b = (N\dot{F})^{-1}$, and 3 lines below must read $\dot{h} = t_c^{-1} = \dot{h}_m N(\dot{h}_m/\dot{F} + N)^{-1}$.

**2.3.3, {41}, 11** 'a elegant' must be 'an elegant' (error spotted by Jaap van der Meer)

**2.5.1, {46}, -9** 'Heating volume stands for the reduction in volume ..' must be replaced by 'Heating length stands for the reduction in length ..' (error spotted by James Maino)

**2.6.1, {52}, 8** 'energy density' must be 'reserve density' (2 times)

**2.6.1, {53}, .** Reference numbers in Fig. 2.11 must be replaced: [918] by [919], [431] by [433], [962] by [963]

**2.6.2, {56,57}, .** Reference numbers in Fig. 2.12 must be replaced: [525] by [527], [428] by [430], [738,1244] by [740,1245], [1225] by [1226], [885] by [886]

**2.6.2, {60}, .** Reference numbers in Fig. 2.13 must be replaced: [588] by [590], [986] by [987], [985,1197] by [986,1198]

**2.6.2, {62}, -11** $U_E^b = f[E_m]L_b^3$ should be replaced by $U_E^b = f[E_m]L_b^3/\{\dot{p}_{Am}\}$ (error spotted by Starrlight Augustine)

**2.6.2, {66}, 9** Eq (2.49) must read

$$u_H(\tau) = \frac{g^3(1-\kappa)}{3^3 k^4}\left(6k\tau - 3k^2\tau(2+\tau) + k^3\tau^2(3+\tau) - 6(1-k)(1-\exp(-k\tau))\right)$$

**2.6.2., {57}, 2** 'maintenance rate constant' constant should be 'maintenance rate coefficient' (error spotted by Nina Marn)

**2.7, {70}, .** Reference numbers in Fig. 2.17 must be replaced: [494] by [796], [440] by [442]

**2.7.1, {72}, 6** Eq (2.59): $-Hku_H^p$ must be $-ku_H^p$

**2.9, {77}, -13** 'energy density' must be 'reserve density'

**3.2.3, {85}, 4** Eq (3.6): '$i \in \{C, H, O, N\}$' must be '$* \in \{C, H, O, N\}$' (error spotted by Ana Llandres)

**3.4, {93}, 15** Table 3.3: $\mu_E$ must be $\overline{\mu}_E$ in the folmula for $y_{VE}$ (error spotted by Charlotte Récapet and Valentin Verdon)

**3.4, {93}, 16** Table 3.3: $y_{EX}$ must be $y_{XE}$ in the folmula for $y_{VE}$ (error spotted by Charlotte Récapet and Valentin Verdon)

**3.4, {93}, -15** Table 3.3: $\dot{k}_M = j_{EV} y_{VE}$ must be $\dot{k}_M = j_{EM} y_{VE}$

**3.4, {93}, -12** Table 3.3: $j_{EV} = -[J_{EV}]/[M_V]$ must be $j_{EM} = [J_{EM}]/[M_V]$ (error spotted by Elke Zimmer and Ben Martin)

**3.4, {93}, -12** Table 3.3: the units of $\{\dot{p}_T\}$ must be $\mathrm{J\,d^{-1}m^{-2}}$ (error spotted by Elke Zimmer)

**3.7.4, {106}, -9** Eq (3.35): $\frac{\dot{k}_{S_1}\dot{k}_{S_2}j'_{S_2}}{\dot{k}_{S_2}+j'_{S_1}+j'_{S_2}}$ must be $\frac{\dot{k}_{S_1}\dot{k}_{S_2}j'_{S_2}}{(\dot{k}_{S_1}+j'_{S_1})(\dot{k}_{S_2}+j'_{S_1}+j'_{S_2})}$

**3.7.3, {105}** Lower-left panel of Figure 3.7: $j_A^+ = \frac{1}{\dot{k}_B^{-1}+j_B'^{-1}}$ must be $j_A^+ = \frac{1}{\dot{k}_A^{-1}+j_A'^{-1}}$

**3.7.4, {107}, 6** Eq (3.38): $\rho$ must be $\rho_{S_2}$ (error spotted by Erik Noonburg)

**3.7.4, {107}, 6** Eq (3.38): $w$ must be $\rho_{S_2}$ (error spotted by Mike Kearney)

**3.7.4, {107}, 9** Eq (3.39): $a$ must be $A$ in numerator for $j_{S_2}^+$

**4.1.1, {115}, 19** 'energy density' must be 'reserve density' (2 times)

**4.1.4, {118}, 6** $e \leq l + l_T$ must be $e \geq l + l_T$ (error spotted by Elke Zimmer)

**4.1.4, {120}, -8** '(2.10)' must be '(2.11)' (error spotted by Nina Marn)

**4.1.5, {122}, 11** Eq (4.6): $j_{EC}$ must be $\kappa j_{EC}$. Also holds for line 1 (2 times)

**4.2.2, {128}, 10** Eq (4.15):$(e - \dot{r}/\dot{k}_E)$ must be $e(1 - \dot{r}/\dot{k}_E)$, two times (error spotted by Tjalling Jager)

**4.2.2, {129}, -7** 'energy density' must be 'reserve density'

**4.2.2, {130}, 19** Just under Eq (4.22): 'which' must be $Y_g$. (error spotted by Jaap van der Meer)

**4.2.2, {131}, .** Reference numbers in Fig. 4.11 must be replaced: [1168] by [1169], [212] by [214], [671] by [673], [798] by [800]

**4.2.2, {132}, 11** In the table for yield coefficients under Droop: $Y_g \frac{g}{f+f}$ must be $Y_g \frac{g}{f+g}$. (error spotted by Jaap van der Meer)

**4.2.3, {133}, -16** 'energy density' must be 'reserve density'

**4.3, {144}, 8** 'energy density' must be 'reserve density'

**4.3, {146}, -3** Figure 4.19: The values for $M_{VC}/M_V$ in the table must be

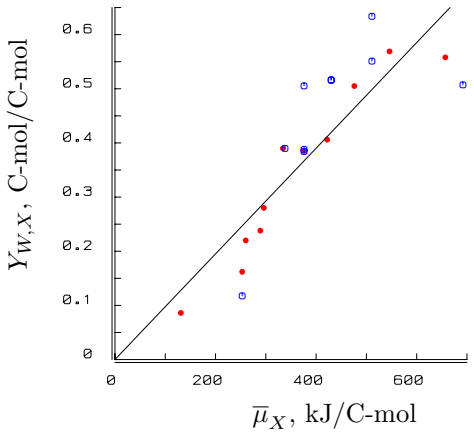
| | | | | |
|---|---|---|---|---|
| $M_{CV}/M_V$, $\frac{\text{mol}}{\text{mol}}$ | 200 | 0.585 | 0.217 | 0.198 |
| $M_{CV}/M_V$, $\frac{\text{mol}}{\text{mol}}$ | 400 | 0.645 | 0.263 | 0.092 |
| $M_{CV}/M_V$, $\frac{\text{mol}}{\text{mol}}$ | 472 | 0.703 | 0.297 | 0.000 |

(error spotted by Ana Llandres)

**4.4, {147}, -11** In (4.49) the term $\left(1 - n_{NE}\frac{n_{CN}}{n_{NN}}\right)\eta_{VG}\dot{p}_G$ must be replaced by $\left(1 - n_{VE}\frac{n_{CN}}{n_{NN}}\right)\eta_{VG}\dot{p}_G$ (error spotted by Ana Llandres)

**4.4, {147}, -3** In (4.50) the term $l_T/g$ must be replaced by $l_T e/g$, and (4.50) only applies if $k = 1$ (error spotted by Jaap van der Meer)

**4.8.3, {164}, 1** Figure 4.22 should have looked as




**4.5.1, {152}, -4** In (4.60) the term $\frac{n_{NE}}{n_{NN}}$ of the right term must be replaced by $\frac{n_{NV}}{n_{NN}}$ (error spotted by Ana Llandres)

**4.10, {169}, 11** In (4.89) the term $(1-\kappa)f^2$ must be replaced by $(1-\kappa)f^3$ (error spotted by Dina Lika)

**4.11.2, {176}, 6** In legends for Fig. 4.28, $k$ must be $\delta_l$ (error spotted by Starrlight Augustine)

**5.2.2, {195}, 5** $j_{VM_i} \leq j_{VM_i}$ must be $j_{VM_i} \leq j_V^{M_i}$ (error spotted by Dina Lika)

**5.2.6, {200}, -8** 'Treating ammonia and nitrogen' must be 'Treating ammonia and nitrate' (error spotted by Mike Kearney)

**5.2.6, {201}, 8** $j'_{*A} = \rho_* y_{*E} j_{*A}$ must be $j'_{*A} = \rho_* y_{E*} j_{*A}$ (error spotted by Dina Lika)

**5.3.1, {203}, 4** In lower-left panel of Fig. 5.8 'hheart' must be 'heart' (error spotted by Starrlight Augustine)

**5.3.3, {210}, 11** $\dot{J}'_{*1*2}$ must be $\dot{J}'_{*1*_2}$ (error spotted by Mike Kearney)

**6.4.2, {231}, -1** Eq (6.13): $\frac{<M_Q>_w(t_R^+)}{<M_Q>_w(t_R^-)}$ must be $\frac{<M_Q>_w(t_R^-)}{<M_Q>_w(t_R^+)}$

**7.2.3, {263}, 14** Eq (7.45): $\frac{d}{dt}\theta_{.EX}$ must be $\frac{d}{dt}\theta_{.X}$

**7.2.4, {264}, -1** 'Trost' must be 'Troost' (error spotted by Jaap van der Meer)

**7.2.5, {266}, -7** $\dot{X}$ must be $\dot{J}_X$ (error spotted by Dina Lika)

**7.3.1, {274}, 4** $\dot{J}_{XA} = \{\dot{J}_{XAm}\}f$ must be $\dot{J}_{XA} = \{\dot{J}_{XAm}\}V^{2/3}f$ (error spotted by Dina Lika)

**7.8.2, {288}, 14** Above Eq (7.84): $L_T$ must be replace by $L_T^*$ in the expression for $\dot{r}$ with $L_T^* = L_T \mathcal{M}(V)$ (error spotted by Starrlight Augustine)

**7.8.2, {288}, 15** Eq (7.84): $\frac{d}{dt}L = \frac{\dot{v}}{3}$ must be $\frac{d}{dt}L = \frac{\dot{r}}{3}$

**7.8.2,{288}, 16** Under Eq (7.84): $g$ does not depend on changes in surface area-volume relationships, so $g^*$ in (7.84) should be replaced by $g$ (error spotted by Elke Zimmer), see comments.

**7.9.2, {290}, -21** 'energy density' must be 'reserve density'

**8.1.2, {297}, 13** , $\{\dot{J}_{Xm}\}/\{\dot{p}_{Am}\}$ should be $\{\dot{J}_{XAm}\}/\{\dot{p}_{Am}\}$ (error spotted by Nina Marn)

**8.2.1, {300}, -5** $\{\dot{p}_{Am}\}_1$ must be $\{\dot{p}^1_{Am}\}$ (error spotted by Jaap van der Meer)

**8.2.1, {300}, -5** $[E_G^1] = [E_G^1]$ must be $[E_G^2] = [E_G^1]$ (error spotted by Elke Zimmer)

**8.2.2, {302}, -6** It best to avoid adding C-moles of different types on dimensional grounds and work with weights: $\theta_V = \frac{W_V}{W_V + W_E} = \frac{w_V M_V}{w_V M_V + w_E M_E} \overset{f=1}{=} \frac{w_V [M_V]}{w_V [M_V] + w_E [M_E m]} = \frac{w_V [M_V]}{w_V [M_V] + w_E \frac{y_{EV}[M_V]}{g\kappa}} = \frac{1}{1 + \frac{w_E y_{EV}}{w_V g \kappa}} = \frac{1}{1+\omega_w} = \frac{1}{1 + \frac{w_E y_{EV}^{\mathrm{ref}} [E_m] z}{w_V [E_G]}}$

**8.2.2, {302}, -6** Eq (8.3) $z^{-3} l_T^{\mathrm{ref}}$ must be $z^{-1} l_T^{\mathrm{ref}}$ (error spotted by James Maino)

**8.2.2, {320}, 10** Table 8.3 The reference for Tyto must be 'De Groot, R.S., 1983. Origin, status and ecology of the owls in the Galapagos. *Ardea*, **71**, 167-182' (error spotted by Carlos Teixeira)

**8.2.2, {323}, -3** 'energy density' must be 'reserve density'

**8.2.2, {324}, 3** '3/4, but 1' must be '1/4, but 1/3' (error spotted by James Maino)

**9.2.1, {350}, -14** and further $X_K$ must be $K$ (error spotted by Jaap van der Meer)

**9.2.1, {351}, -11** Eq (9.12) and further: $\jmath_{Xm}$ must be $\jmath_{XAm}$ (error spotted by Jaap van der Meer)

**9.2.2, {360}, 9** 'with body size' must be 'with food density' (error spotted by Clément Aldebert)

**9.2.3, {368}, 2** 'energy density' must be 'reserve density'

**9.3.1, {375}, -13** 'and dead producers' must be 'and dead consumers' (error spotted by Jaap van der Meer)

**9.3.1, {375}, -17** 'where consumers" must be 'where producers" (error spotted by Jaap van der Meer)

**9.4.1, {380}, 13** '$1 + x_P + x_C$' must be '$1 + x_P + x_D$' (error spotted by Jaap van der Meer)

**9.4.1, {380}, 15** '$\dot{J}_{ED,\,A2C} = m_{ED}\dot{J}_{VD,\,A_2C}$' must be '$\dot{J}_{ED,\,A_2C} = m_{ED}\dot{J}_{VD,\,A_2C}$' (error spotted by Jaap van der Meer)

**9.4.1, {380}, -6** '$\dot{J}_{E_iP,\,A_1C}$' must be '$\dot{J}_{E_iP,\,A_iC}$' (error spotted by Jaap van der Meer)

**9.4.1, {380}, -5** '$\dot{J}_{ED,\,A_2D}$' must be '$\dot{J}_{ED,\,A_2C}$' (error spotted by Jaap van der Meer)

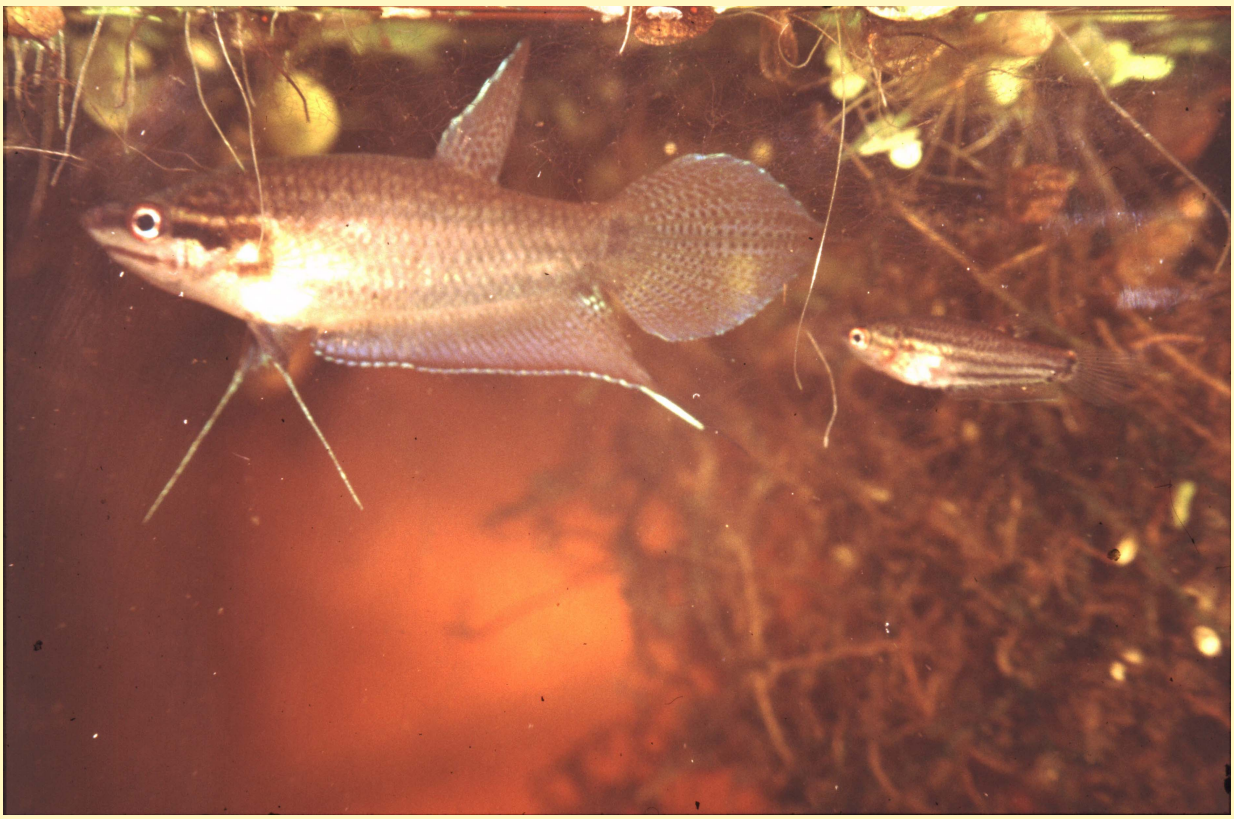
**9.4.1, {380}, -1** '$-0.2\dot{J}_{VP} - 0.4\dot{J}_{EP}$' must be '$-0.2\dot{J}_{VD} - 0.4\dot{J}_{ED}$' (error spotted by Jaap van der Meer)

**9.4.1, {381}, 3** '1000 for light' must be '4 for light' (error spotted by Jaap van der Meer)

**10.4, {407}, -12** 'Triurdaceae' must be 'Triuridaceae'

**notation, {499}, 6** 'energy density' must be 'reserve energy density'(2 times)

**notation, {502}, -1** $V^{1/3}/L$ must be $L/L_w$ (error spotted by Tjalling Jager)



These talking gouramis, *Trichopsis vittatus*, come from the same brood and therefore are the same age. They also grew up in the same aquarium. The size difference resulted from competition for a limited amount of food chunks, which amplified tiny initial size differences. This illustrates that age cannot serve as a satisfactory basis for the description of growth and food intake should be included explicitly.

**Dynamic Energy Budget (DEB) theory** is a formal theory for the uptake and use of substrates (food, nutrients, light) by organisms and their use for maintenance, growth, maturation and propagation; it applies to all organisms (microorganisms, animals, plants). The document gives background, explanation and extension for the third edition of the DEB book.