Différence Gompertz/Beverthon-Holt

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Beverton-Holt

$$\begin{aligned} N_{t+1,1} &= \frac{N_{t+1,1}e^{\rho_1}}{1+\alpha_{11}N_{t,1}+\alpha_{12}N_{t,2}} \\ \Rightarrow \ln(N_{t+1,1}) &= \ln(N_{t,1}) + \rho_1 - \ln(1+\alpha_{11}N_{t,1}+\alpha_{12}N_{t,2}) \end{aligned}$$

Gompertz

$$\ln(N_{t+1,1}) = r_1 + a_{11}\ln(N_{t,1}) + a_{12}\ln(N_{t,2})$$

So, ingnoring the growth rate close to low densities ρ_1 and r_1, we need to compare $(a_{11}-1)\ln(N_{t,1})+a_{12}\ln(N_{t,2})$ and $\ln(1+\alpha_{11}N_{t,1}+\alpha_{12}N_{t,2})$. We have a look at the limits, ingoring differences in coefficients of interaction to 1 for now.

BH	x<1	x>>1
y<1	~ 0	$\sim \ln(x)$
y>>1	$\sim \ln(y)$	$\sim \ln(x+y) \begin{cases} \ln(\max(x,y)) \\ \ln(2)+\ln(x) & if x \approx y \end{cases}$

Gompertz	x<1	x>>1
y<1	~ 0 OR $<< 0$	si y>0.5, $\sim ln(x)$
y>>1	si x>0.5, $\sim \ln(y)$	$\sim \ln(x)+\ln(y) \begin{cases} \ln(x)+\ln(y) \\ \ln(x^2) & if x \approx y \end{cases}$

Table 1: Comparison of dynamic behaviours at the limit