Appendix A. – Details of the dimensional analysis

We begin by defining the expected average value for induction levels and herbivore densities in the absence of spatial patterns, which are given by the uniform space equilibria $\bar{I}^*$ and $\bar{H}^*$. Using these definitions and following our choices in the text, we non-dimensionalize the OBE model by setting $\hat{t} = \delta t$, $\hat{\tau} = \delta\tau$, $\hat{H} = \frac{H}{\bar{H}^*}$, $\hat{I} = \frac{I}{\bar{I}^*}$, $\hat{b} = \frac{b}{\bar{H}^*}$, $\hat{m} = \frac{m}{\delta}$, $\hat{d} = \frac{d}{\delta}$, and $\hat{\chi} = \frac{\chi}{\delta}\bar{I}^*$, where $\bar{I}^* = \frac{\alpha\left(\bar{H}^*\right)^\theta}{\delta\left(b^\theta + \left(\bar{H}^*\right)^\theta\right)}$ and $\bar{H}^* = \frac{R}{m}$. The resulting rescaled equation is

$$\begin{aligned}
\frac{d\hat{I}_j}{d\hat{t}} &= \left(1+\hat{b}^\theta\right)\frac{\hat{H}^\theta_{j,\hat{t}-\hat{\tau}}}{\hat{b}^\theta + \hat{H}^\theta_{j,\hat{t}-\hat{\tau}}} - \hat{I}_j \\
\frac{d\hat{H}_j}{d\hat{t}} &= \hat{m}\left(1-\hat{H}_j\right) - \left(\hat{d}+\hat{\chi}\hat{I}_j\right)\hat{H}_j + \frac{1}{2}\left(\hat{d}+\hat{\chi}\hat{I}_{j-1}\right)\hat{H}_{j-1} + \frac{1}{2}\left(\hat{d}+\hat{\chi}\hat{I}_{j+1}\right)\hat{H}_{j+1}
\end{aligned} \quad . \qquad \text{(A.1)}$$

We follow a similar rescaling for the OBME model with the exception that $\hat{\beta} = \frac{\beta}{\delta}\bar{I}^*$ and $\bar{H}^* = \frac{R}{\gamma\bar{I}^*}$, yielding

$$\begin{aligned}
\frac{d\hat{I}_j}{d\hat{t}} &= \left(1+\hat{b}^\theta\right)\frac{\hat{H}^\theta_{j,\hat{t}-\hat{\tau}}}{\hat{b}^\theta + \hat{H}^\theta_{j,\hat{t}-\hat{\tau}}} - \hat{I}_j \\
\frac{d\hat{H}_j}{d\hat{t}} &= \hat{\beta}\left(1-\hat{I}_j\hat{H}_j\right) - \left(\hat{d}+\hat{\chi}\hat{I}_j\right)\hat{H}_j + \frac{1}{2}\left(\hat{d}+\hat{\chi}\hat{I}_{j-1}\right)\hat{H}_{j-1} + \frac{1}{2}\left(\hat{d}+\hat{\chi}\hat{I}_{j+1}\right)\hat{H}_{j+1}
\end{aligned} \quad . \qquad \text{(A.2)}$$

For the LBME, we set $\bar{H}^* = K - \frac{K\gamma\bar{I}^*}{r}$ and add $\hat{r} = \frac{r}{\delta}$ to the existing non-dimensional quantities which results in

$$
\begin{aligned}
\frac{d\hat{I}_j}{d\hat{t}} &= \left(1+\hat{b}^{\theta}\right)\frac{\hat{H}^{\theta}_{j,\hat{t}-\hat{\tau}}}{\hat{b}^{\theta}+\hat{H}^{\theta}_{j,\hat{t}-\hat{\tau}}}-\hat{I}_j \\
\frac{d\hat{H}_j}{d\hat{t}} &= \hat{r}\hat{H}_j-\left(\hat{r}-\hat{\beta}\right)\hat{H}_j^{\,2}-\hat{\beta}\hat{I}_j\hat{H}_j-\left(\hat{d}+\hat{\chi}\hat{I}_j\right)\hat{H}_j+\frac{1}{2}\left(\hat{d}+\hat{\chi}\hat{I}_{j-1}\right)\hat{H}_{j-1}+\frac{1}{2}\left(\hat{d}+\hat{\chi}\hat{I}_{j+1}\right)\hat{H}_{j+1}
\end{aligned}
\quad . \text{(A.3)}
$$