Appendix B: semi-discrete model notation and description

Combining the continuous system (1) with the discrete disturbances (2) from the main text leads to the semi-discrete model

$$
\begin{aligned}
&\frac{dR}{dt} = r_A A\left(1-R-A-M\right) - aR - r_M RM - d_R R && t \neq \tau \\
&\frac{dA}{dt} = aR + gA\left(1-R-A-M\right) - \beta AM - d_A A && t \neq \tau \\
&\frac{dM}{dt} = r_M M\left(1-R-A-M\right) + r_M RM + \beta AM - h_b M - h_s M\frac{\omega A}{1+\omega A} && t \neq \tau \\
&R(\tau^+) = \left(1-\gamma(\tau)\right) R(\tau) \\
&A(\tau^+) = \left(1-\gamma(\tau)\right) A(\tau) \\
&M(\tau^+) = M(\tau).
\end{aligned}
\tag{B.1}
$$

where τ are time steps with bleaching events and τ^+ are the instants following bleaching events.