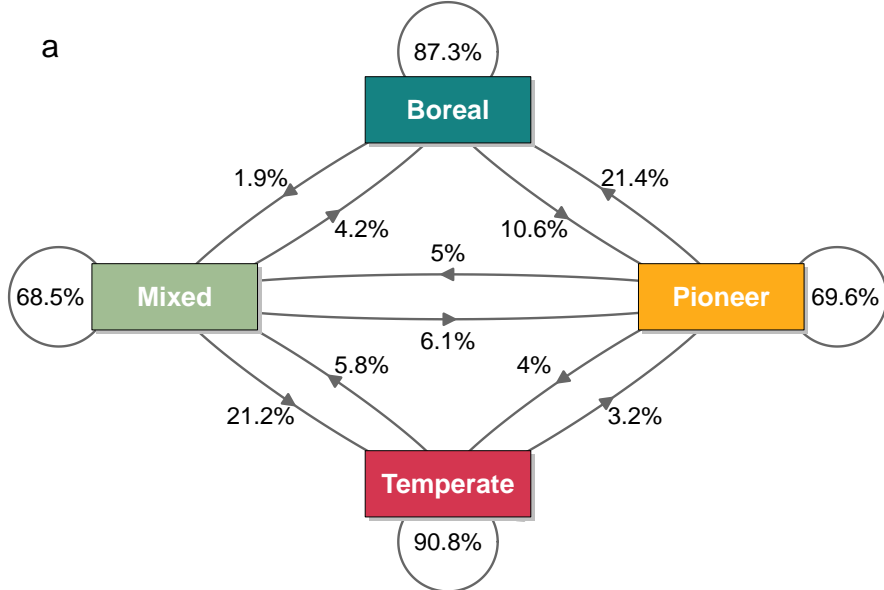


a



b

$$\mathbf{Q} = \begin{vmatrix} -\sum_{s \neq B} q_{Bs} & q_{BM} & q_{BP} & 0 \\ q_{MB} & -\sum_{s \neq M} q_{Ms} & q_{MP} & q_{MT} \\ q_{PB} & q_{PM} & -\sum_{s \neq P} q_{Ps} & q_{PT} \\ 0 & q_{TM} & q_{TP} & -\sum_{s \neq T} q_{Ts} \end{vmatrix}$$

c

$$q_{rs} = q_{rs,0} \times \exp(\beta_{rs,1} \times \text{climate} + \beta_{rs,2} \times \text{soil} + \beta_{rs,3} \times \text{disturbances})$$

for $r \neq s$ and $s \neq \text{Pioneer}$

$$q_{rs} = q_{rs,0} \times \exp(\beta_{rs,3} \times \text{disturbances})$$

for $s = \text{Pioneer}$