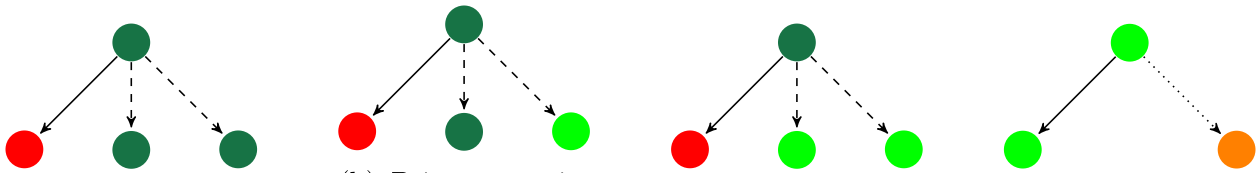

(a) Primary meristem transitioning to one vegetative meristem and generating two primary meristems.

(b) Primary meristem transitioning to one vegetative meristem and generating primary and inflorescence meristems.

(c) Primary meristem transitioning to one vegetative meristem and generating inflorescence meristems.

(d) Inflorescence meristem remaining an inflorescence meristem and generating a floral meristem

Figure 1: Meristem transitions in plants with indeterminate inflorescences.

Description of diagram

The division shown in Figure 1A occurs at rate $\beta_1 p(t)$. The rate is the product of β_1, the ..., and $p(t)$, the probability with which the division shown in Figure 1A occurs. It results in the net gain of one primary meristem and gain of one vegetative meristem. The differential equations corresponding to this are:

$$\begin{aligned}
\dot{P} &= 2\beta_1 p(t)P - \beta_1 p(t)P = \beta_1 p(t)P \\
\dot{V} &= \beta_1 p(t)P \\
\dot{I} &= 0 \\
\dot{F} &= 0
\end{aligned} \tag{1}$$

The division shown in Figure 1B occurs at a rate $\beta_1 q(t)$. The rate is the product of β_1, the ..., and $q(t)$, the probability with which the division shown in Figure 1B occurs. It results in the gain of one vegetative meristem and the gain of one inflorescence meristem. The differential equations corresponding to this are:

$$\begin{aligned}
\dot{P} &= 0 \\
\dot{V} &= \beta_1 q(t) P \\
\dot{I} &= \beta_1 q(t) P \\
\dot{F} &= 0
\end{aligned} \tag{2}$$

The division shown in Figure 1C occurs at a rate $\beta_1 r(t)$. The rate is the product of β_1, the ..., and $r(t)$, the probability with which the division shown in Figure 1C occurs. It results in the net gain of two inflorescence meristems, gain of one vegetative meristem, and the loss of one primary meristem. The differential equations corresponding to this are:

$$\begin{aligned}
\dot{P} &= -\beta_1 r(t) P \\
\dot{V} &= \beta_1 r(t) P \\
\dot{I} &= 2\beta_1 r(t) P \\
\dot{F} &= 0
\end{aligned} \tag{3}$$

The division shown in Figure 1D occurs at a rate β_2. It results in the net gain of one floral meristem. The differential equations corresponding to this are:

$$\begin{aligned}
\dot{P} &= 0 \\
\dot{V} &= 0 \\
\dot{I} &= 0 \\
\dot{F} &= \beta_2 I
\end{aligned} \tag{4}$$

The full system of differential equations for the system thus becomes:

$$\begin{aligned} \dot{P} &= \beta_1(p(t) - r(t))P \\ \dot{V} &= \beta_1(p(t) + q(t) + r(t))P \\ \dot{I} &= \beta_1(q(t) + 2r(t)) \\ \dot{F} &= \beta_2 I \end{aligned} \tag{5}$$

I assume that

$$p(t) + q(t) + r(t) \leq 1 \tag{6}$$

Because they are probabilities, the controls $p(t)$, $q(t)$, and $r(t)$ are constrained on $[0, 1]$. The difference between controls (e.g. $p(t) - r(t)$) is not constrained and can be negative. For example, when the probability of division into two inflorescence meristems is greater than the probability of division into two primary meristems, the value of $\dot{P} < 0$ and corresponds to a decrease in the size of the primary meristem pool. If all primary meristem divisions are like in Panel A, $\dot{I} = 0$. If $p + q + r < 1$ at any point, than it's beneficial to increase p.