Matrizes

Matriz de Lefkovitch (1965)
Baseada em estádios: morfológicos (descontínuos) ou tamanhos (contínuo)

Modelo geral:

$$\begin{vmatrix} n_1 \\ n_2 \\ n_3 \\ \vdots \\ n_s \end{vmatrix}(t+1) = \begin{vmatrix} a_{11} & a_{21} & a_{31} & \cdots & a_{s1} \\ a_{12} & a_{22} & a_{32} & \cdots & a_{s2} \\ a_{13} & a_{23} & a_{33} & \cdots & a_{s3} \\ \vdots & \vdots & \vdots & \cdots & \vdots \\ a_{1s} & a_{2s} & a_{3s} & \cdots & a_{ss} \end{vmatrix} \cdot \begin{vmatrix} n_1 \\ n_2 \\ n_3 \\ \vdots \\ n_s \end{vmatrix}(t)$$

Onde a_{ij} =
se i<j: probabilidade de um indivíduo na classe i passar à classe j, após um intervalo de tempo
se i=j: probabilidade de um indivíduo na classe i permanecer na mesma classe após um intervalo de tempo
se i>j: número médio de indivíduos da classe j, produzidos por indivíduo da classe i, após um intervalo de tempo

Projeção

time

$n(1) = A\,n(0)$ $n(1) = A\,n(0)$

$n(t+1) = A\,n(t)$

$n(t+1) = \lambda\,n(t)$

$n(2) = A\,n(1)$ $n(2) = AAn(0)$

$n(3) = A\,n(2)$ $n(3) = AAAn(0)$

$n(4) = A\,n(3)$ $n(4) = AAAAn(0)$

$n(5) = A\,n(4)$ $n(5) = AAAAAn(0)$

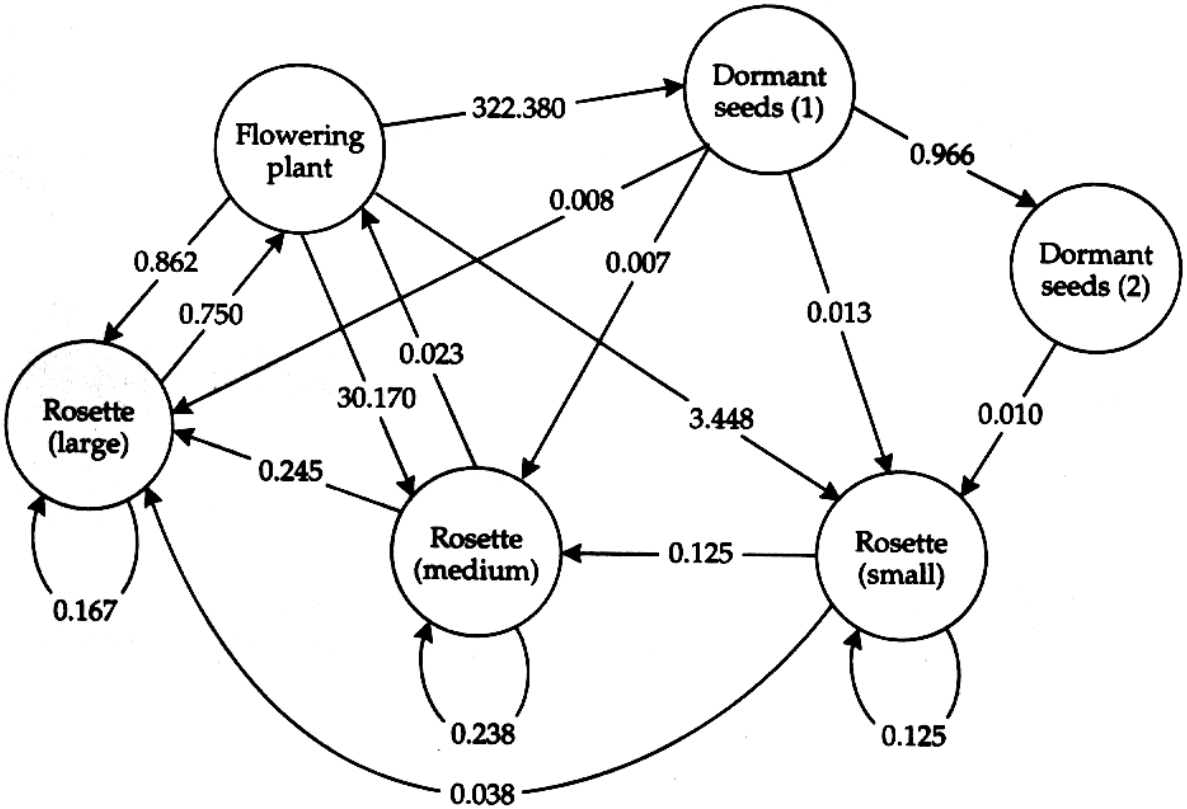
$n(6) = A\,n(5)$ $n(6) = AAAAAAn(0)$

Matrizes

Exemplo: *Dipsacus sylvestris* (Dipsacaceae) (Werner & Caswell 1977)

Matrizes

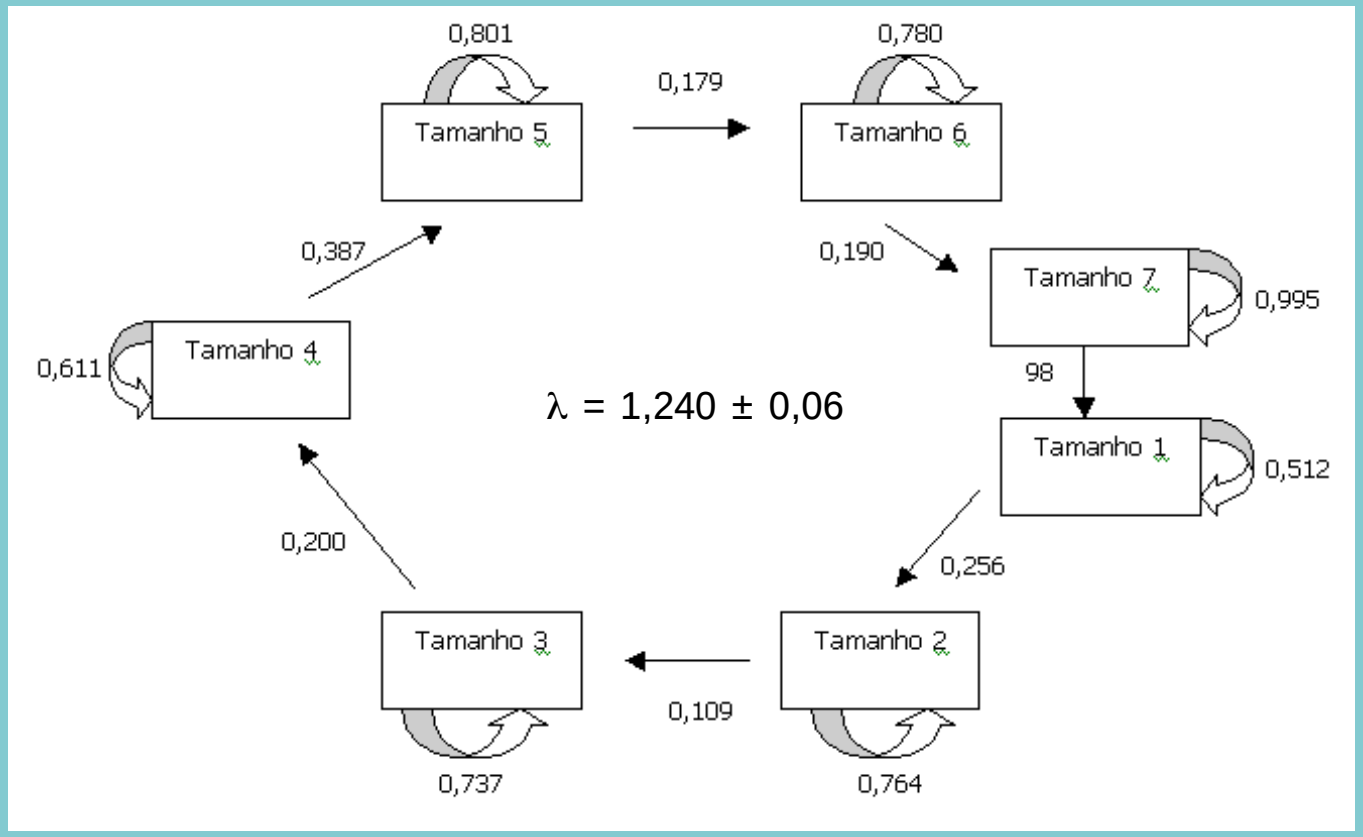
Seed (1)	Seed (2)	Ros (s)	Ros (m)	Ros (l)	Flowering plant
0	0	0	0	0	322.380
0.966	0	0	0	0	0
0.013	0.010	0.125	0	0	3.448
0.007	0	0.125	0.238	0	30.170
0.008	0	0	0.245	0.167	0.862
0	0	0	0.023	0.750	0

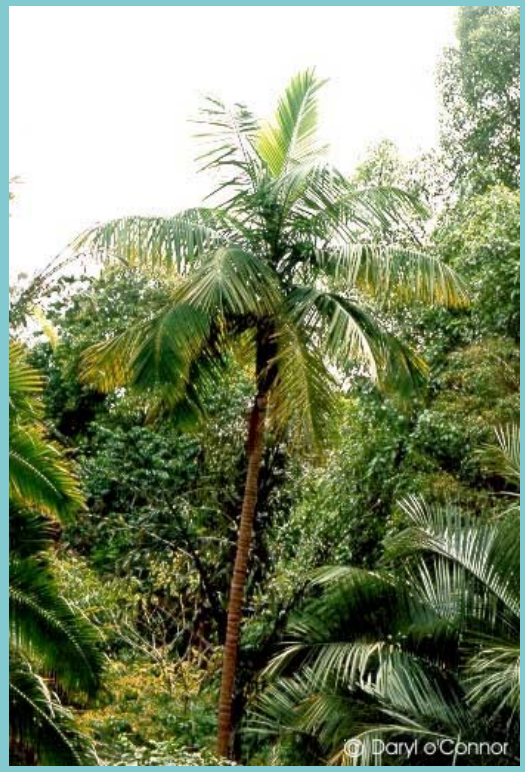


Matrizes

Exemplos de tabelas de vida esquemáticas:

Euterpe edulis – Floresta Paludícola – Mata de Santa Genebra, SP – 250 ha - 1991-1993

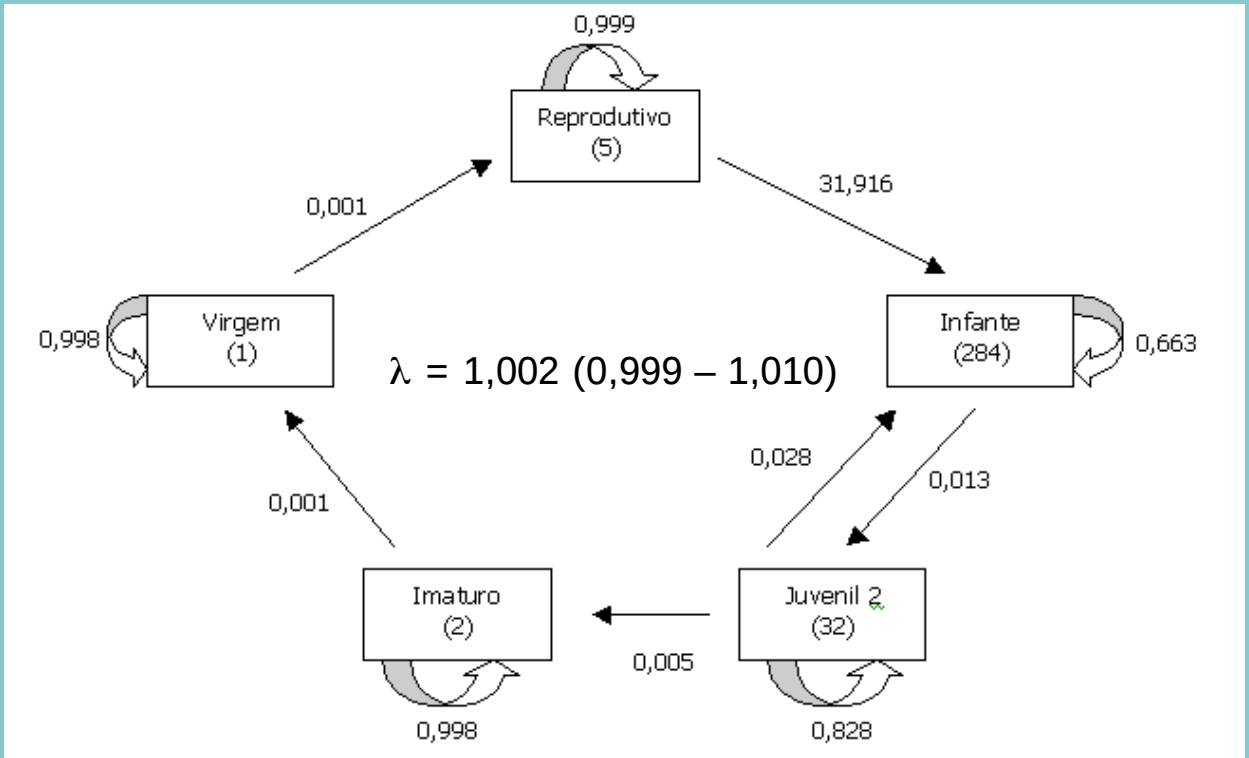




Matos, D.M.S., Freckleton, R.P. & Watkinson, A.R. 1999. The role of density dependence in the population dynamics of a tropical palm. Ecology 80: 2635-2650.

Matrizes

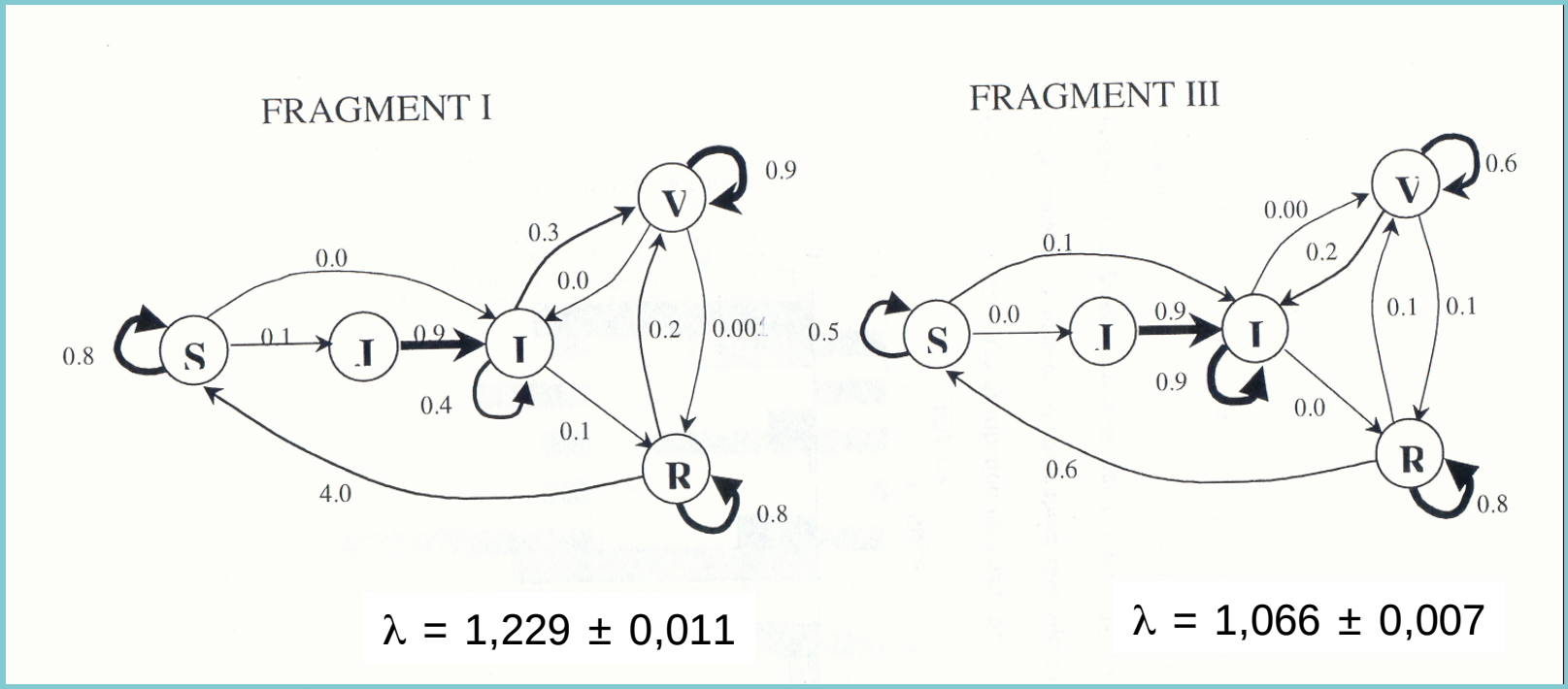
Syagrus romanzoffiana – Floresta Paludícola – Mata de Santa Genebra, SP – 250 ha - 1993-1994



Bernacci, L.C. 2001. Aspectos da demografia da palmeira nativa *Syagrus romanzoffiana* (Cham.) Glassman, jerivá, como subsídio ao seu manejo. Tese de Doutorado. UNICAMP.

Matrizes

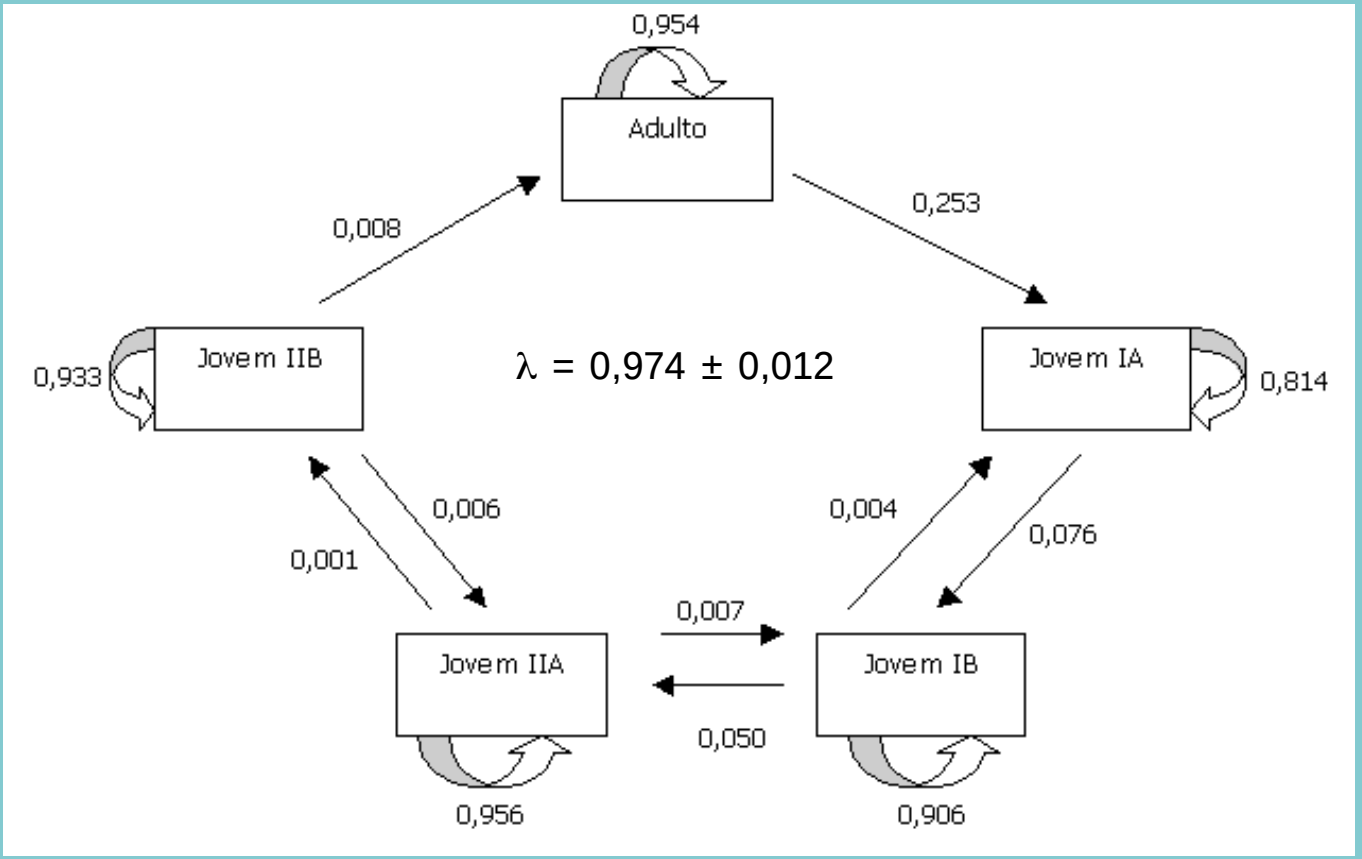
Attalea humilis – Floresta Ombrófila Densa – Poço das Antas, RJ

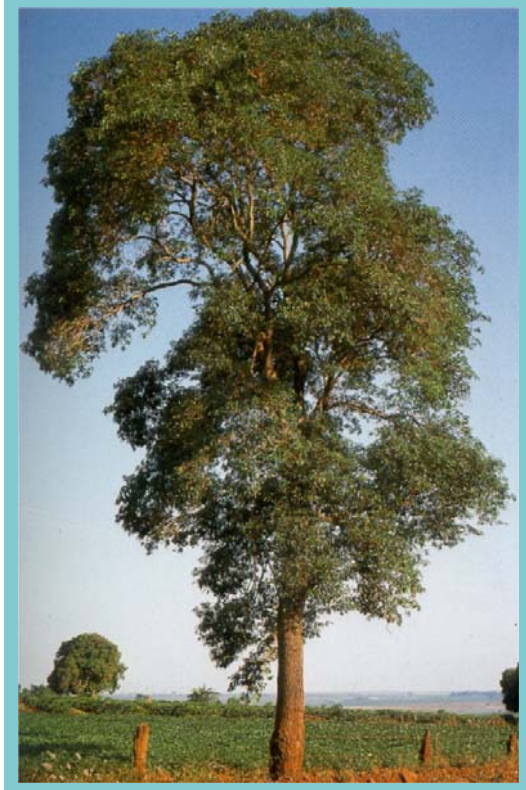


Souza, A.F. 2000. Aspectos da dinâmica de populações da palmeira *Attalea humilis* Mart. ex. Spreng. em fragmentos de floresta Atlântica sujeitos ao fogo. Tese de Mestrado. UNICAMP.

Matrizes

Aspidosperma polyneuron – Floresta Estacional Semidecidual – Mata de Santa Genebra, SP





Sensibilidade: mede a importância de uma pequena mudança em um dado elemento da matriz sobre o auto valor dominante (λ)

Elasticidade: mede a contribuição proporcional de cada elemento da matriz para o autovalor dominante (λ)

Fonseca, M.G. 2001. Aspectos demográficos de *Aspidosperma polyneuron* Muell. Arg. (Apocynaceae) em dois fragmentos de floresta semidecídua no município de Campinas, SP. Tese de Mestrado. UNICAMP.

Matrizes

Modelos considerando idades e estádios (Law 1983)

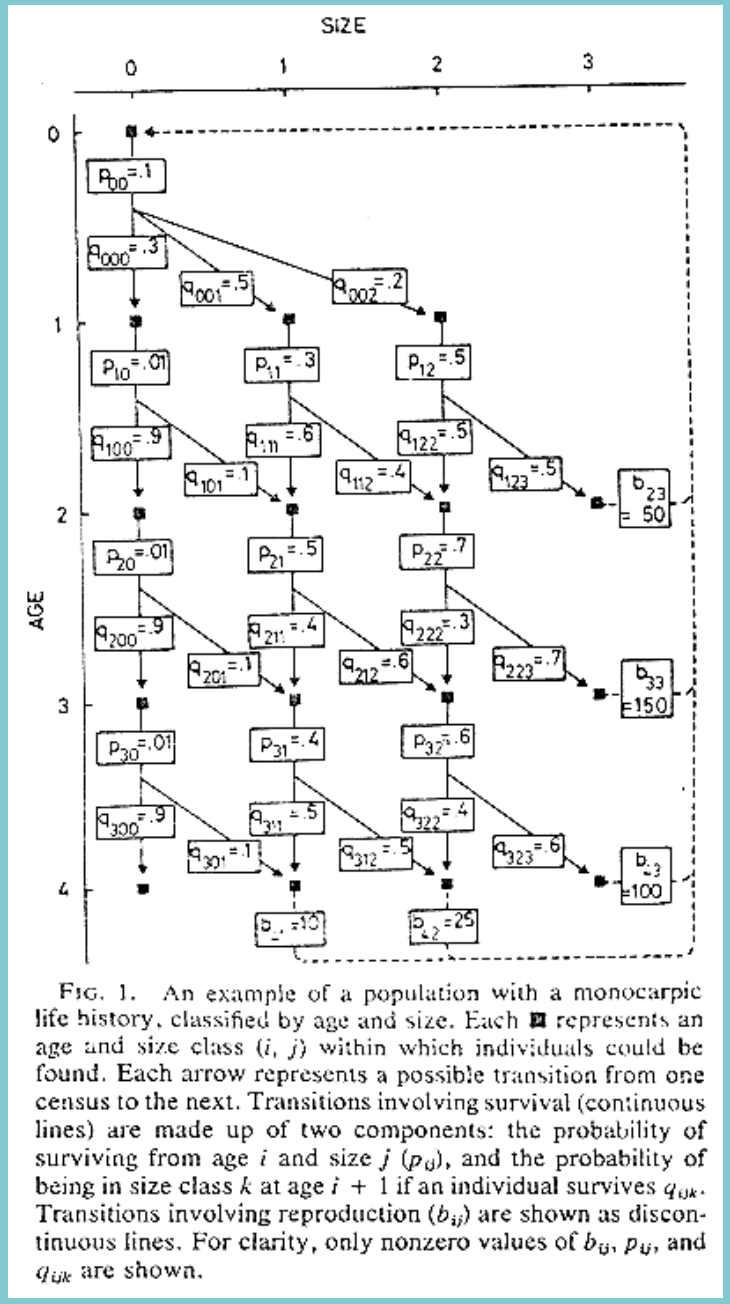


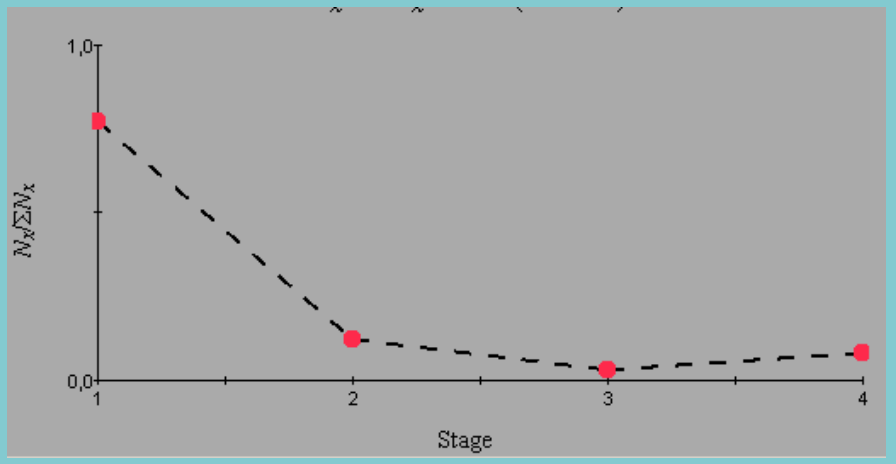
FIG. 1. An example of a population with a monocarpic life history, classified by age and size. Each ■ represents an age and size class (i, j) within which individuals could be found. Each arrow represents a possible transition from one census to the next. Transitions involving survival (continuous lines) are made up of two components: the probability of surviving from age i and size j (p_{ij}), and the probability of being in size class k at age $i + 1$ if an individual survives q_{ijk}. Transitions involving reproduction (b_{ij}) are shown as discontinuous lines. For clarity, only nonzero values of b_{ij}, p_{ij}, and q_{ijk} are shown.

Size at age $i+1$	Size at age i: 0	1	2	3	
	Survival probability				
0	0.03	0	0	0	$= \mathbf{P}_0$
1	0.05	0	0	0	
2	0.02	0	0	0	
3	0	0	0	0	
0	0.009	0	0	0	$= \mathbf{P}_1$
1	0.001	0.18	0	0	
2	0	0.12	0.25	0	
3	0	0	0.25	0	
0	0.009	0	0	0	$= \mathbf{P}_2$
1	0.001	0.2	0	0	
2	0	0.3	0.21	0	
3	0	0	0.49	0	
0	0.009	0	0	0	$= \mathbf{P}_3$
1	0.001	0.2	0	0	
2	0	0.2	0.24	0	
3	0	0	0.36	0	

Matriz de Projeção Populacional – Tamanho ou Estádio

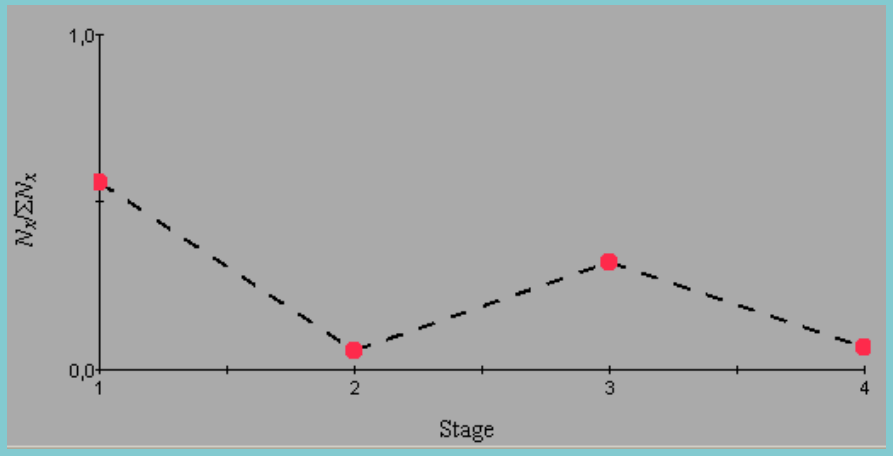
$$\begin{bmatrix} 0.1 & 0.0 & 0.0 & 12.0 \\ 0.2 & 0.1 & 0.0 & 0.0 \\ 0.0 & 0.3 & 0.1 & 0.0 \\ 0.1 & 0.2 & 0.4 & 0.0 \end{bmatrix}$$

λ=1,3752



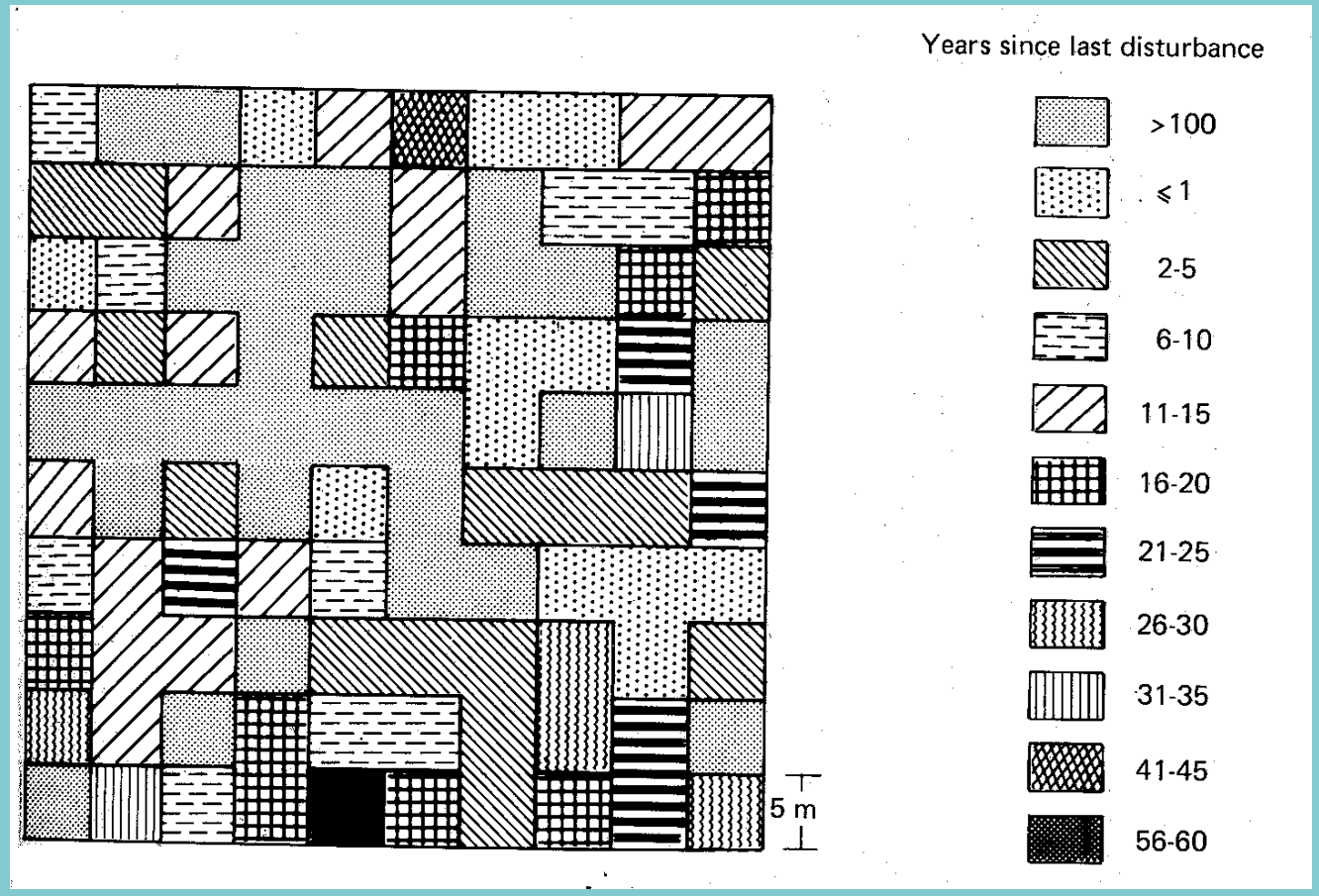
$$\begin{bmatrix} 0.1 & 0.0 & 0.0 & 12.0 \\ 0.1 & 0.5 & 0.0 & 0.0 \\ 0.5 & 0.5 & 0.5 & 0.0 \\ 0.1 & 0.1 & 0.1 & 0.0 \end{bmatrix}$$

λ=1,4679



Mosaicos de Perturbação (clareiras, furacões, fogo)

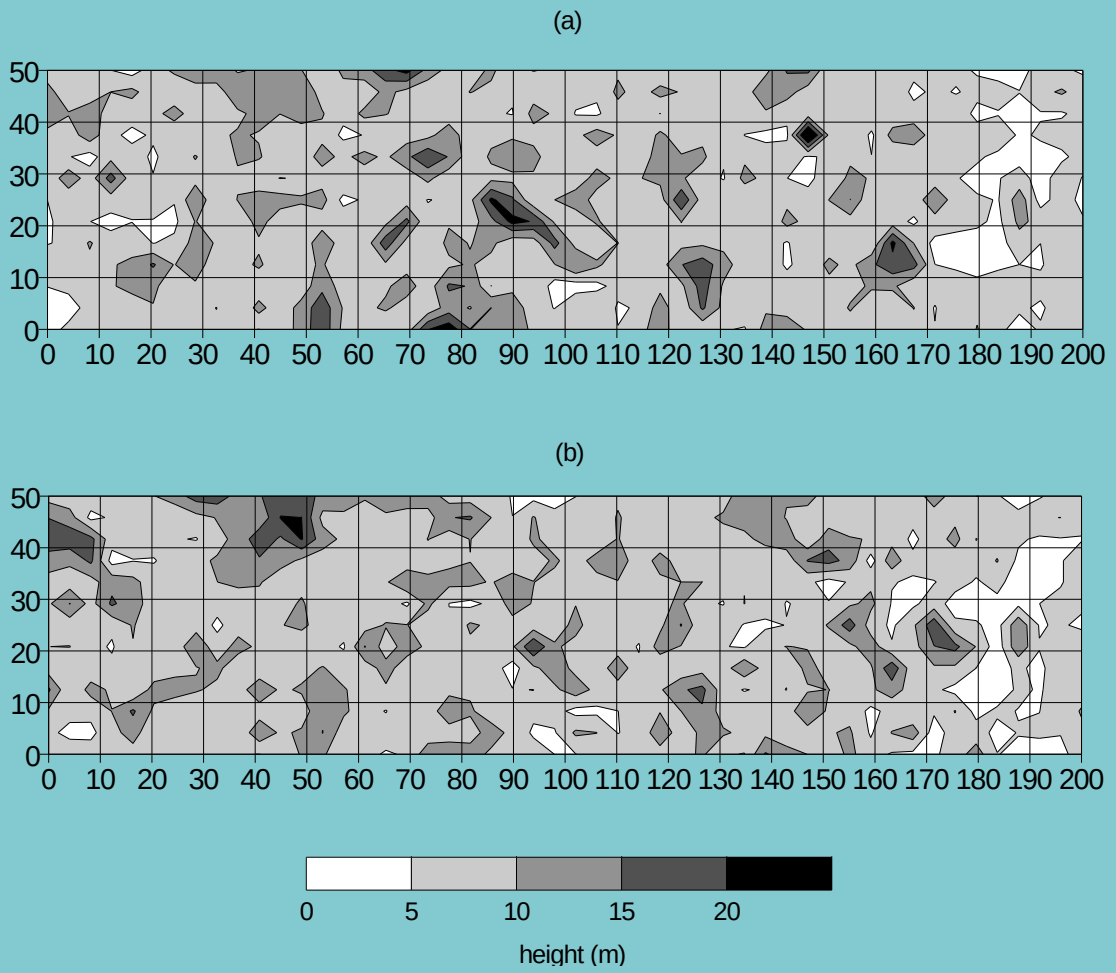
Manchas de perturbação recorrente



Sarukhán, J., Piñero, D. & Martínez-Ramos, M. 1985. Plant demography: A community-level interpretation. In: White, J. (ed.). Studies on Plant Demography. Academic Press, London. p. 17- 31.

Mosaicos de Perturbação (clareiras, furacões, fogo)

Os estados do habitat variam no tempo



Santos, F.A.M., Tamashiro, J.Y., Rodrigues, R.R. & Shepherd, G.J. 1996

Mosaicos de Perturbação (clareiras, furacões, fogo)

Dinâmica inclui transições demográficas e de estados do habitat

Cada estado do habitat leva a uma matriz de projeção diferente

Matriz de transição do habitat

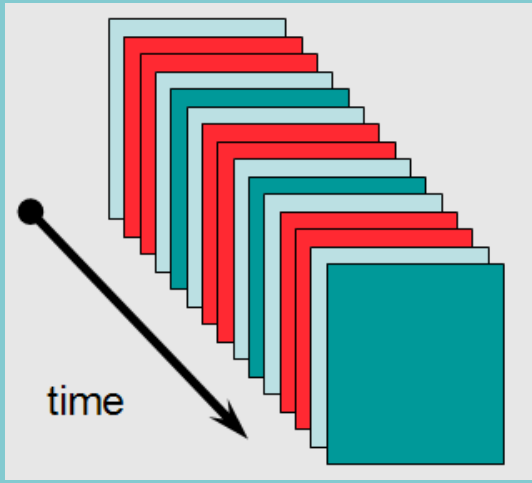
Patch type at time t+1	**Patch type at time t**		
	Green	Red	Blue
Green	0	0.5	1.0
Red	0.5	0.5	0
Blue	0.5	0	0

Projeção da abundância relativa de tipos de habitat no tempo

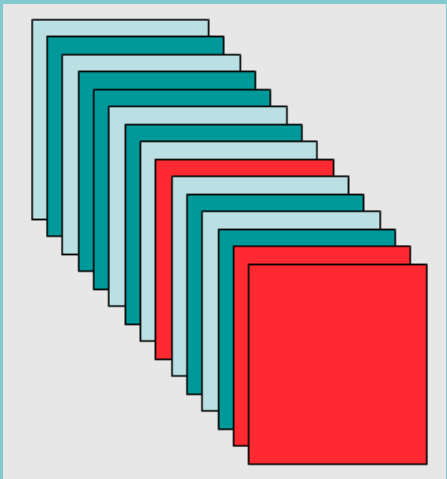
Estrutura de habitat estável

Mosaicos de habitat temporais

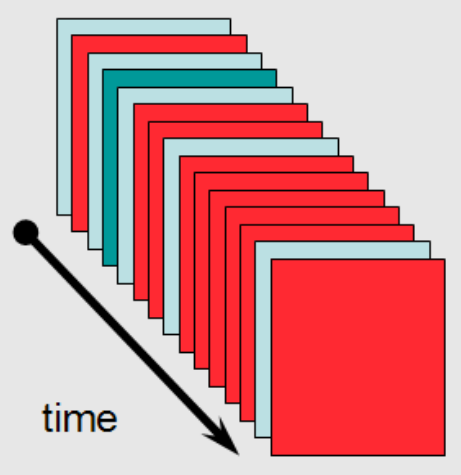
Fixed sequence



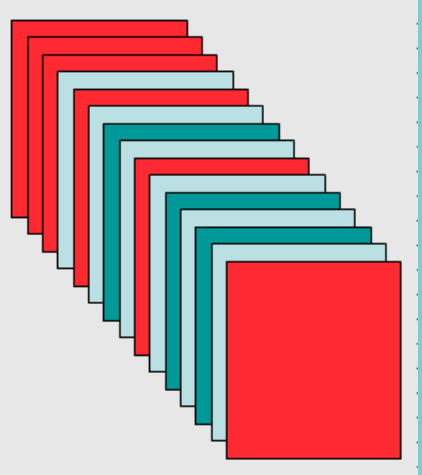
Stochastic sequence first set



Stochastic sequence 2nd set



Stochastic sequence 3rd set



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