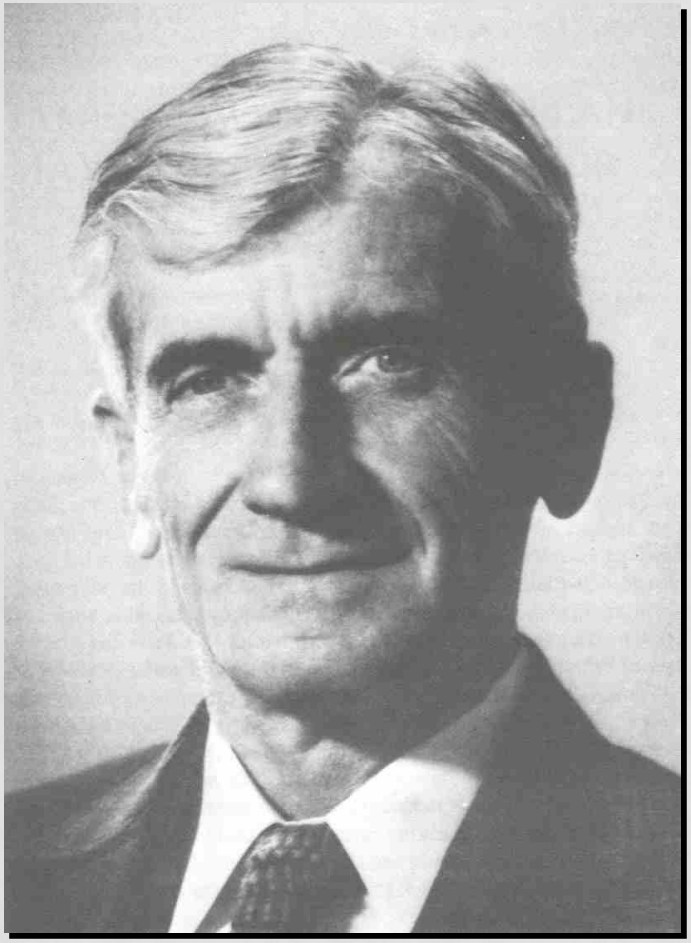
EPIDEMIOLOGIA – CONCEITOS BÁSICOS

A epidemiologia de doenças de plantas foi fundada por
J.E. VANDERPLANK
em 1963

Vanderplank identificou os
padrões regulares
e propôs os
princípios gerais
da Epidemiologia de doenças de plantas

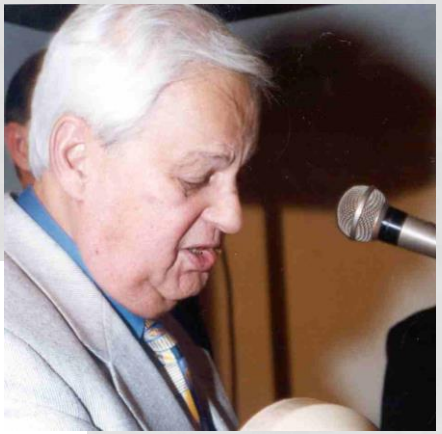


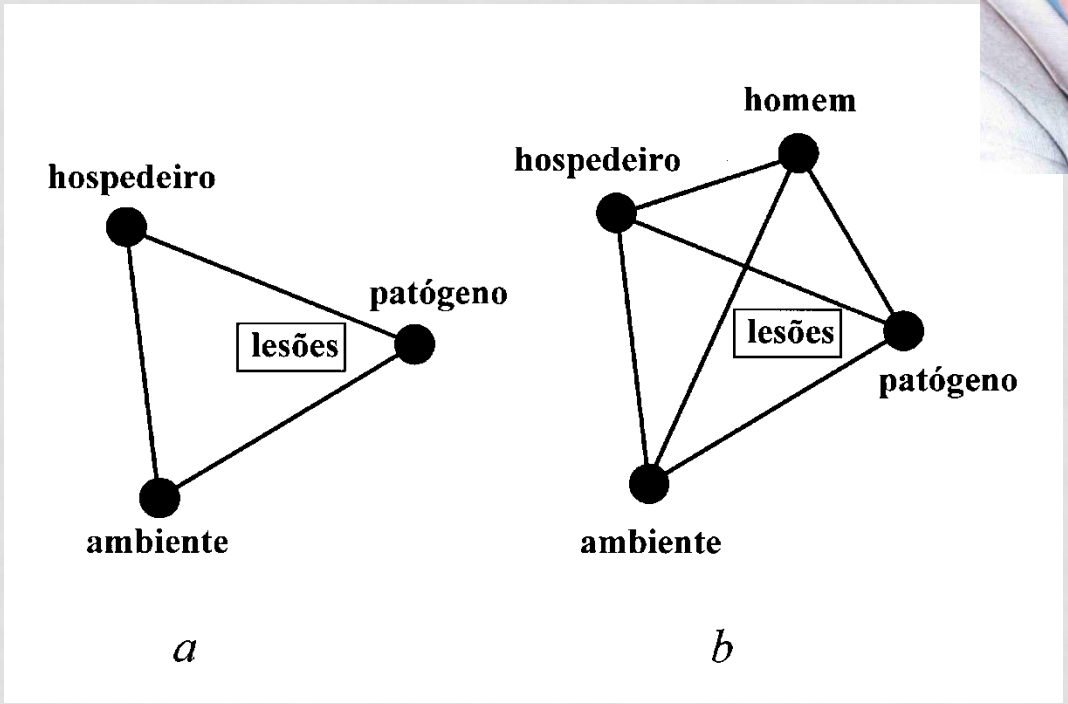
J.E. Vanderplank
1908-1997

EPIDEMIOLOGIA – CONCEITOS BÁSICOS

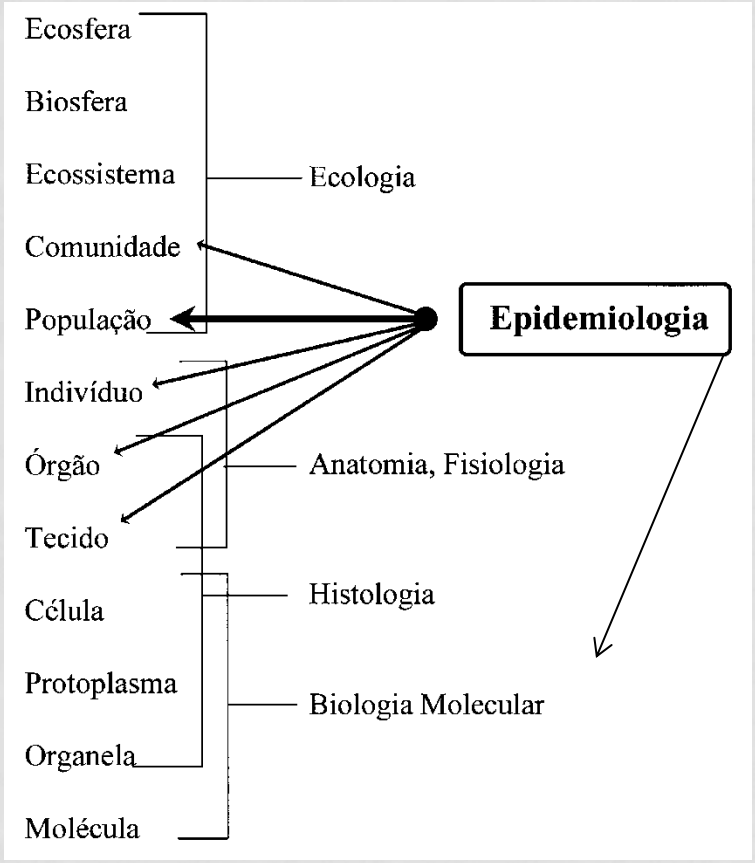
A ciência da doença em populações (Vanderplank, 1963)

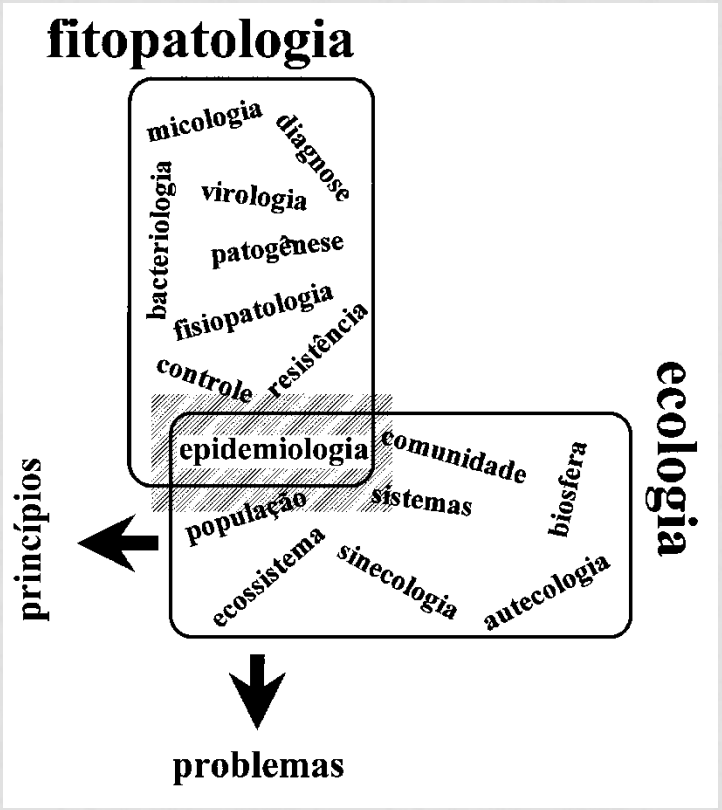
O estudo de populações de patógenos em populações de hospedeiros e da doença resultante desta interação, sob a influência do ambiente e a interferência humana (Kranz, 1974)





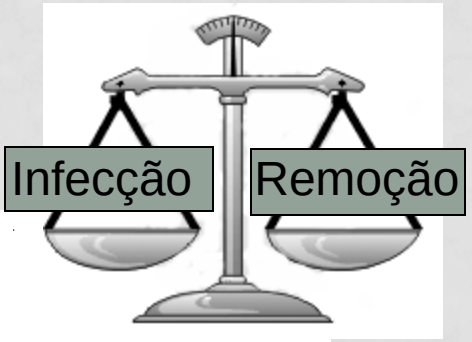
EPIDEMIOLOGIA – CONCEITOS BÁSICOS

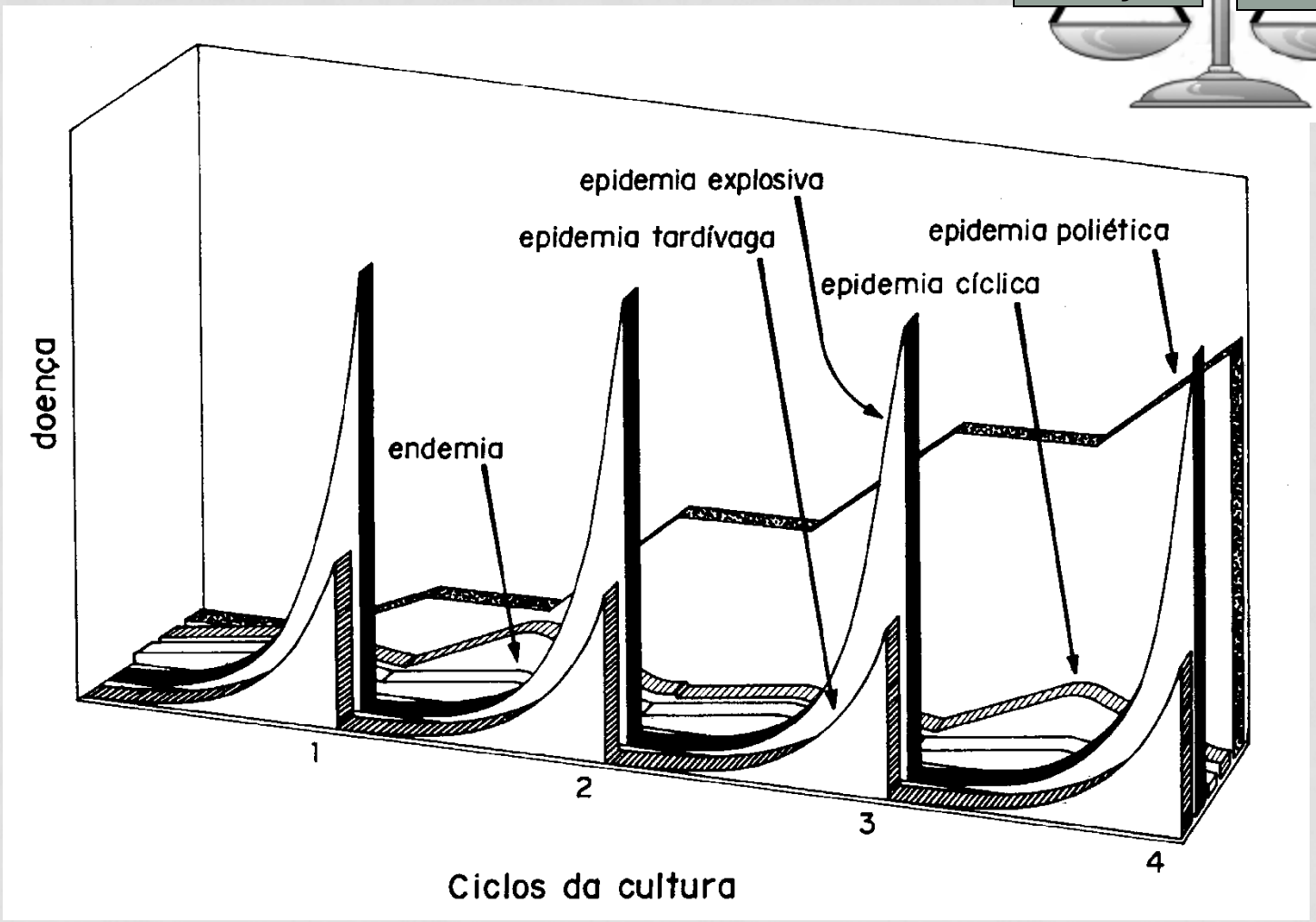




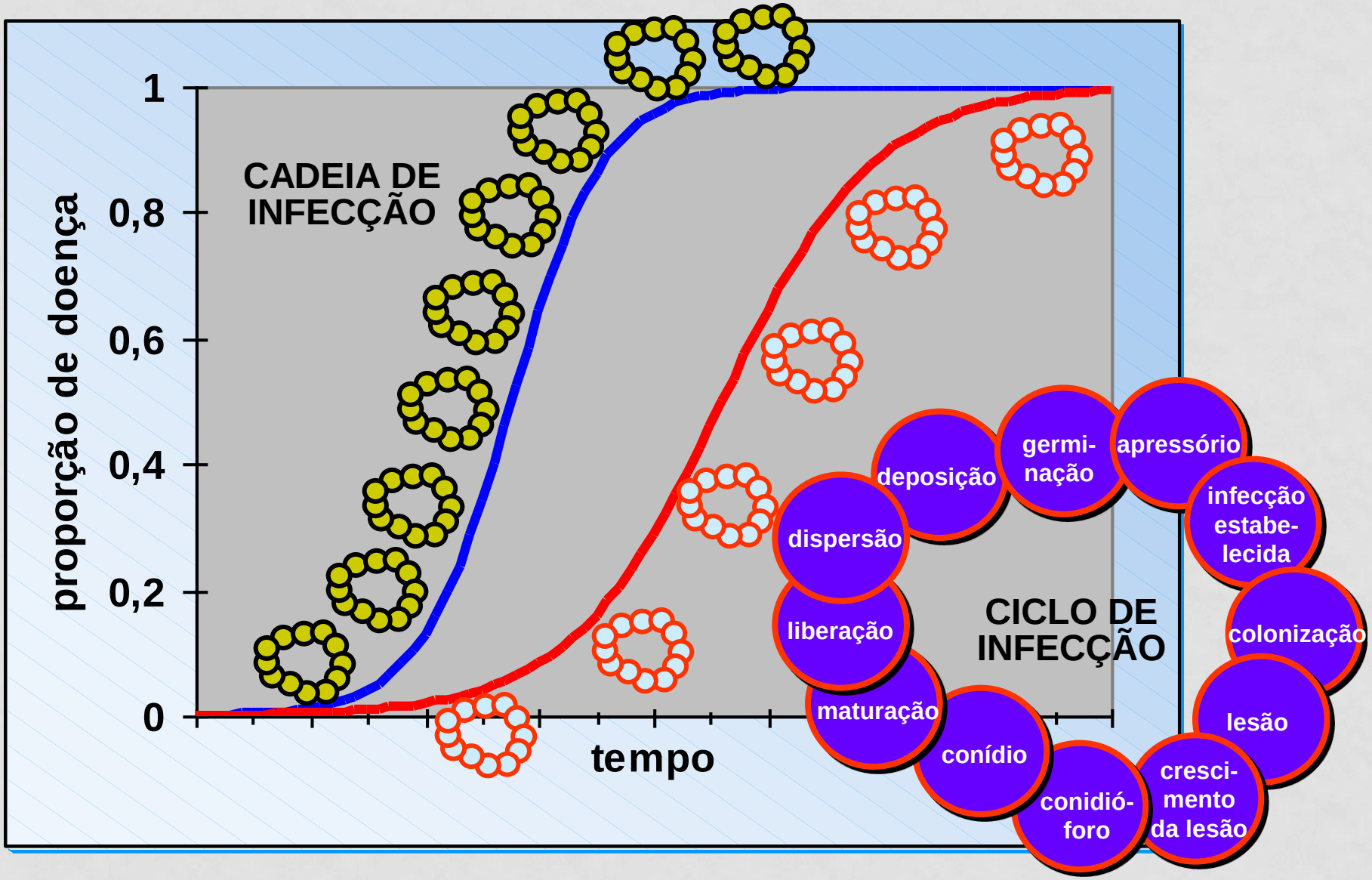
EPIDEMIA e ENDEMIA

Endemia



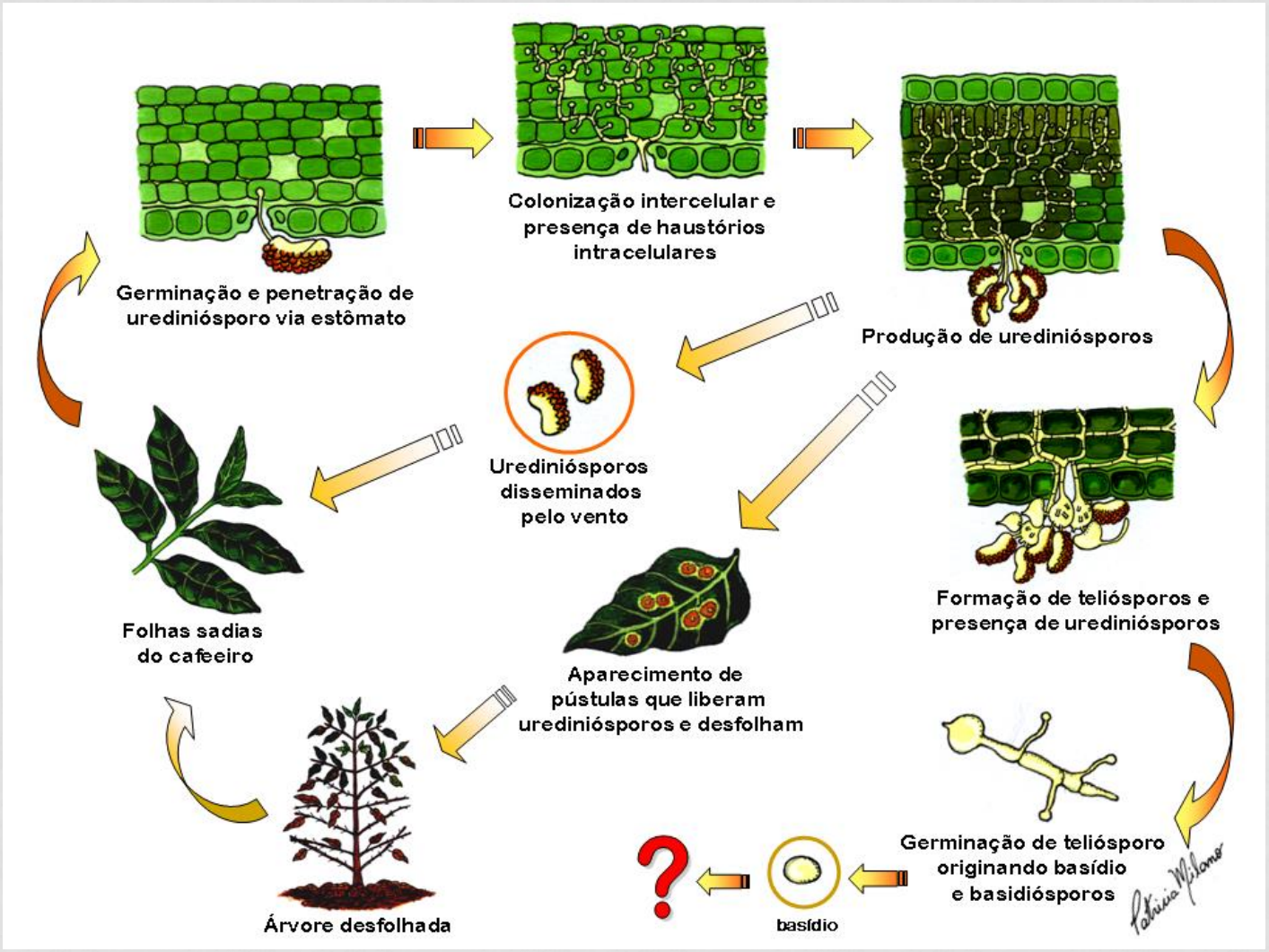


CICLO DE INFECÇÃO, CADEIA DE INFECÇÃO E A CURVA DE PROGRESSO DA DOENÇA



EPIDEMIOLOGIA – CONCEITOS BÁSICOS

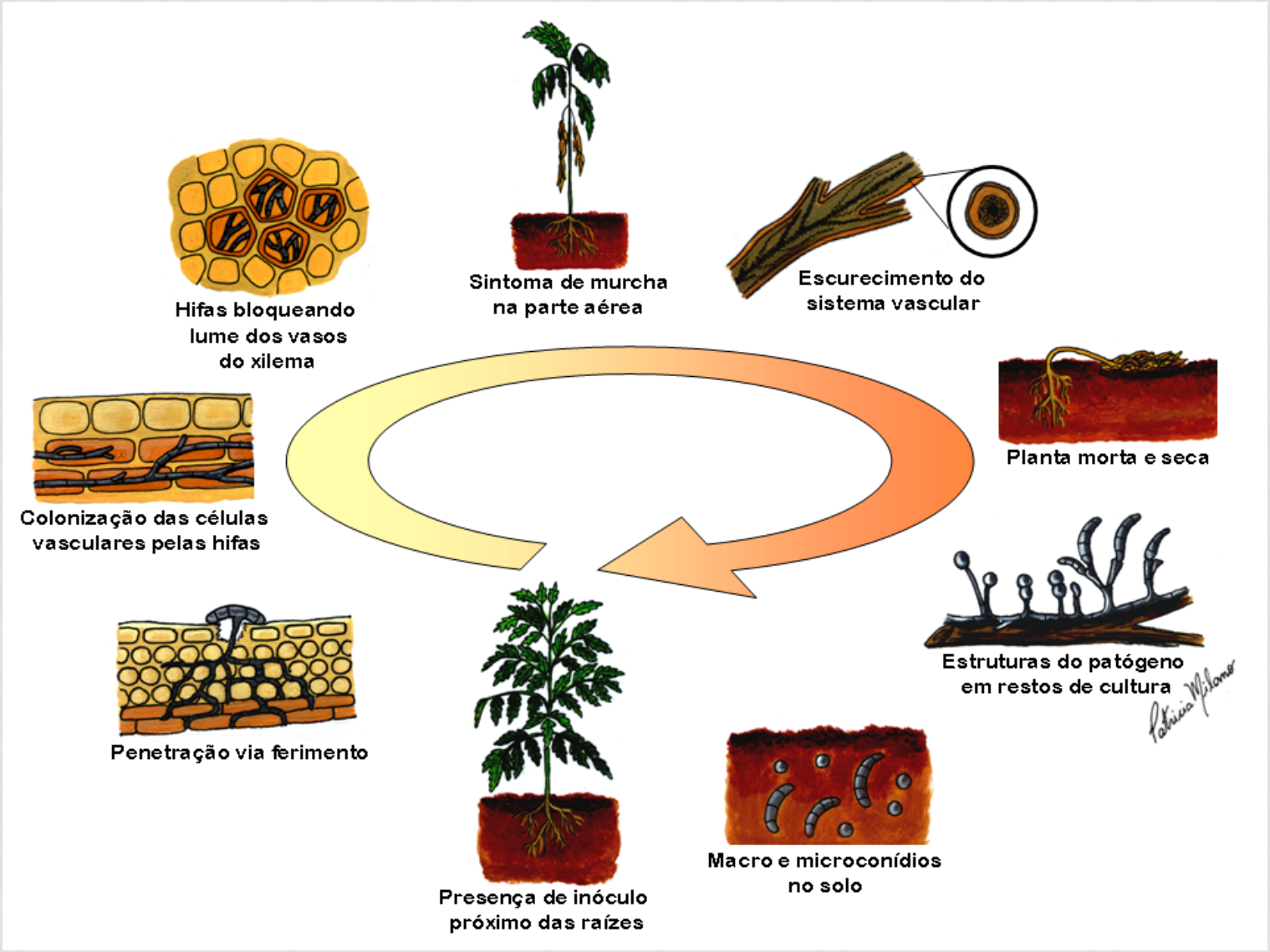
Policíclicas – juros compostos Ferrugem do cafeeiro



EPIDEMIOLOGIA – CONCEITOS BÁSICOS

Monocíclicas – juros simples

Murcha vascular do tomateiro



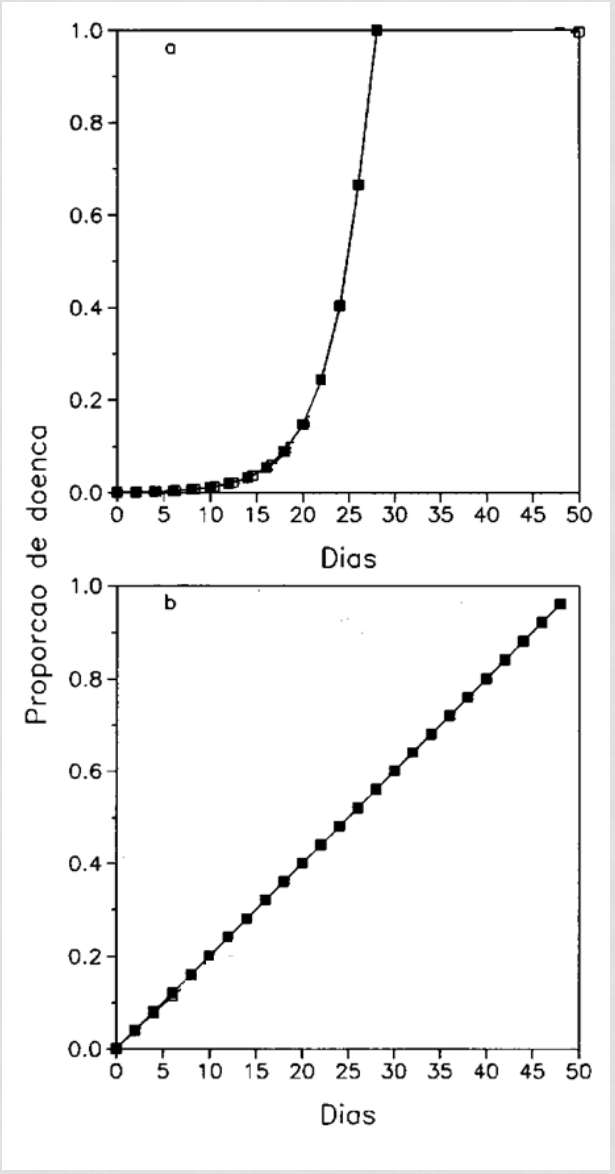
CURVAS DE PROGRESSO DE DOENÇAS

Doenças de juros compostos

$$dy/dt = ry$$
$$y = y_o \exp(rt)$$

Doenças de juros simples

$$dy/dt = QR$$
$$y = y_o + QRt$$



CURVAS DE PROGRESSO DE DOENÇAS

Doenças de juros compostos

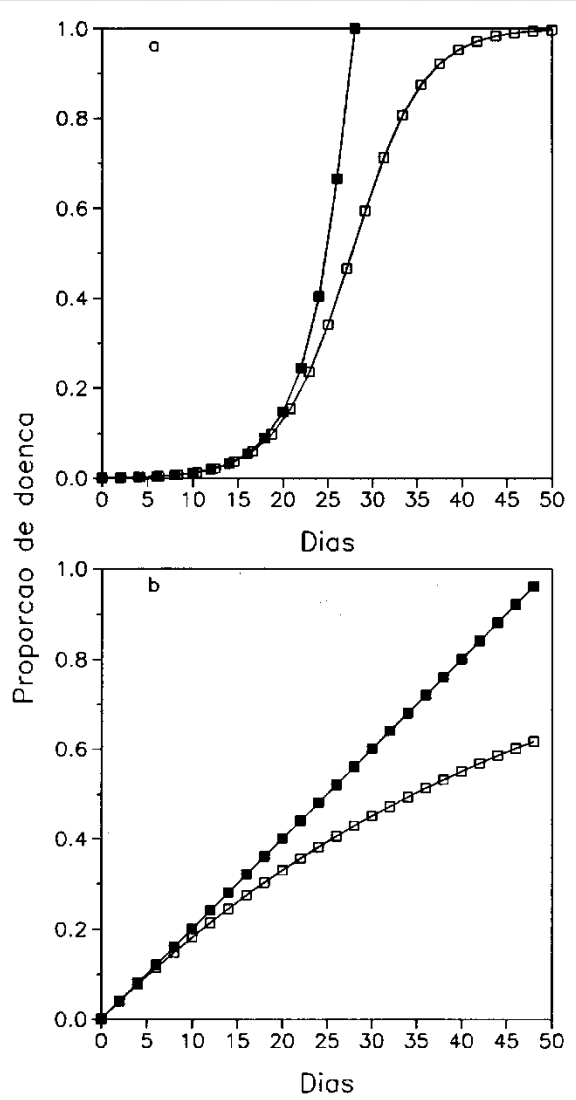
$dy/dt = ry$

$y=y_o \exp(rt)$ Correto?

Doenças de juros simples

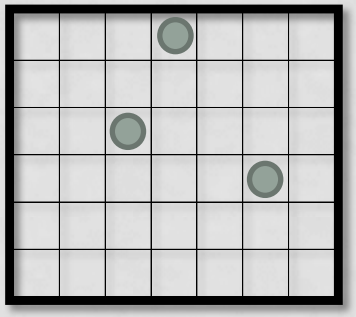
$dy/dt = QR$

$y=y_o + QRt$ Correto?

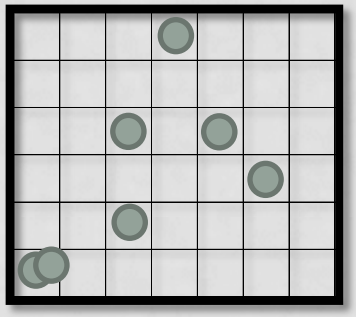


CURVAS DE PROGRESSO DE DOENÇAS

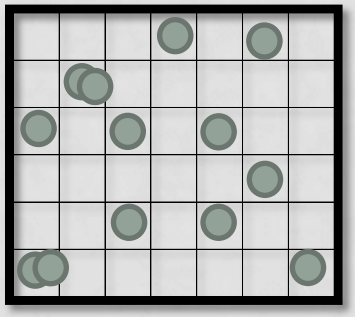
y=7%



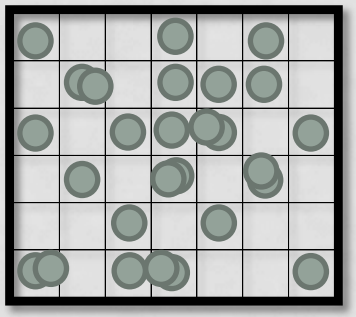
y=15%



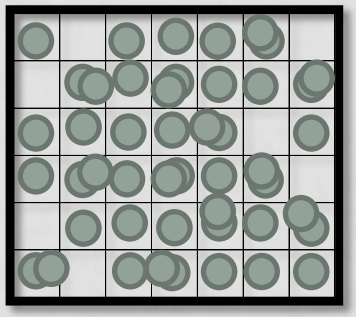
y=26%



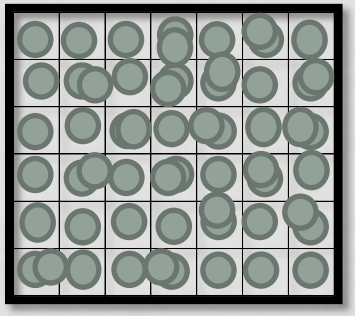
y=50%



y=83%



y=100%



CURVAS DE PROGRESSO DE DOENÇAS

Doenças de juros compostos

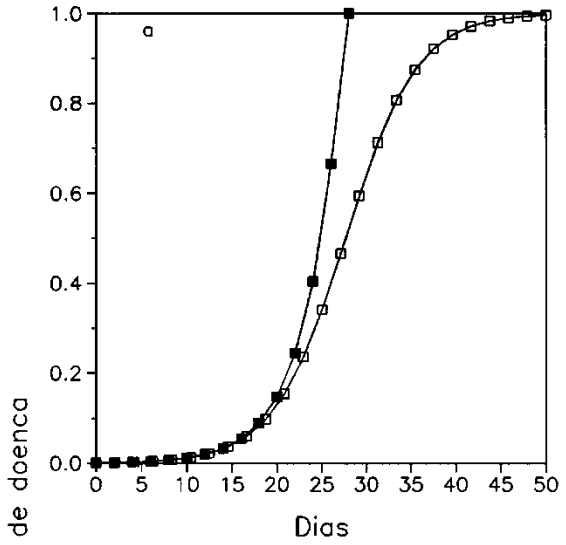
$dy/dt = ry\ (1-y)$

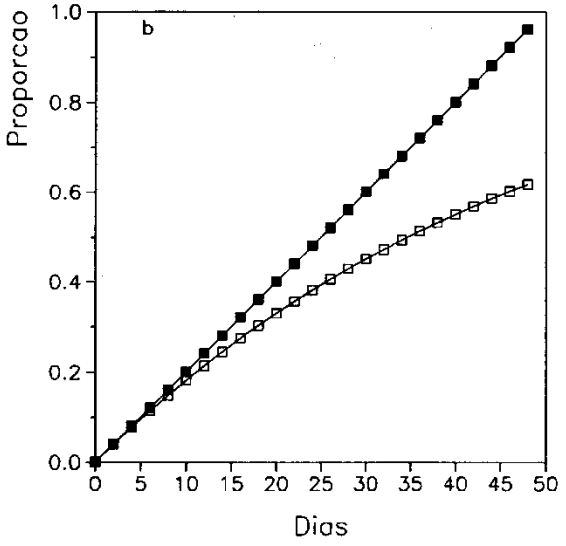
$y=1/(1+((1/y_o)-1)\exp(-rt))$

Doenças de juros simples

$dy/dt = QR\ (1-y)$

$y=1-(1-y_o)\exp(-rt)$





CURVAS DE PROGRESSO DE DOENÇAS

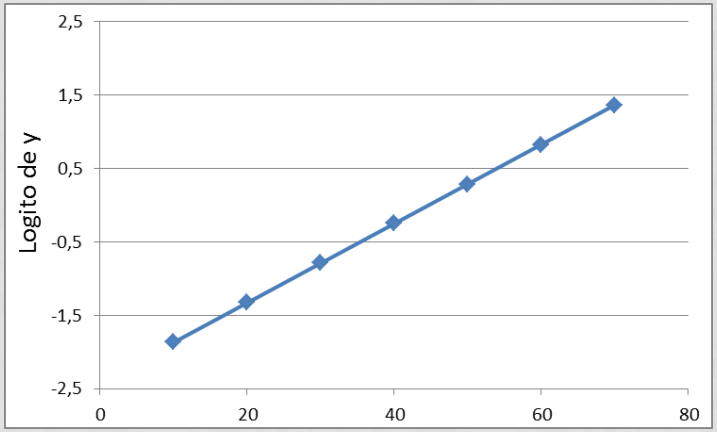
Doenças de juros compostos

$$\ln(y/(1-y)) = \ln(y_o/(1-y_o)) + rt$$

Logito de y

logito de y = logito de y_o + rt

$y = a + bx$



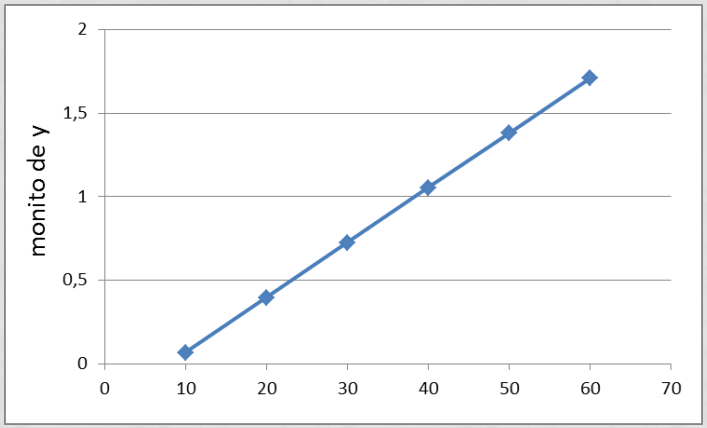
Doenças de juros simples

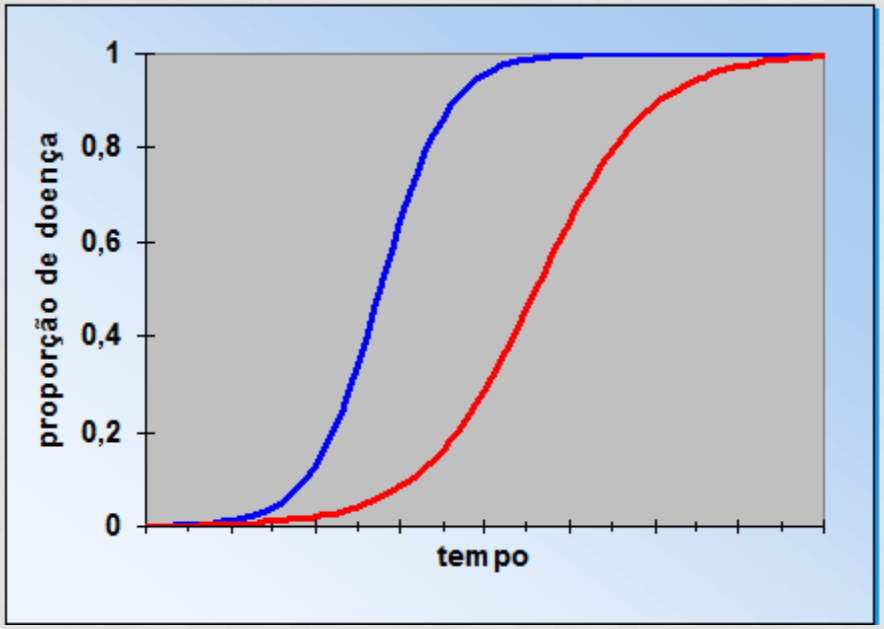
$$\ln(1/(1-y)) = \ln(1/(1-y_o)) + QRt$$

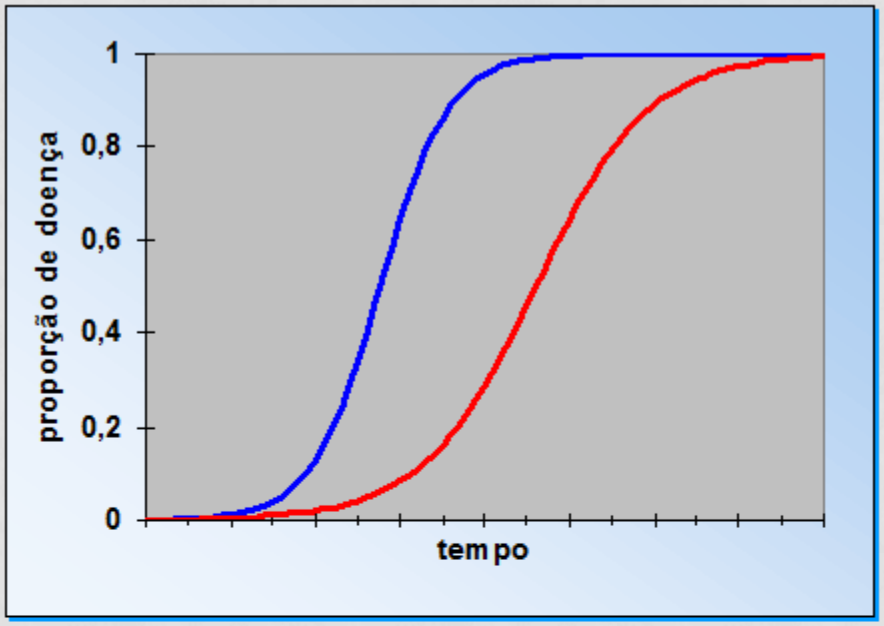
Monito de y

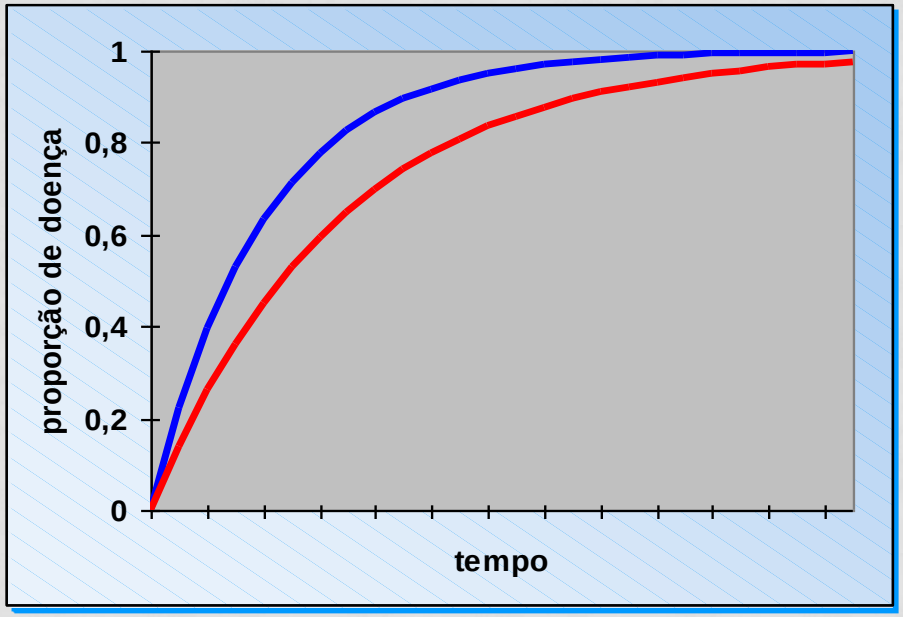
monito de y = monito de y_o + rt

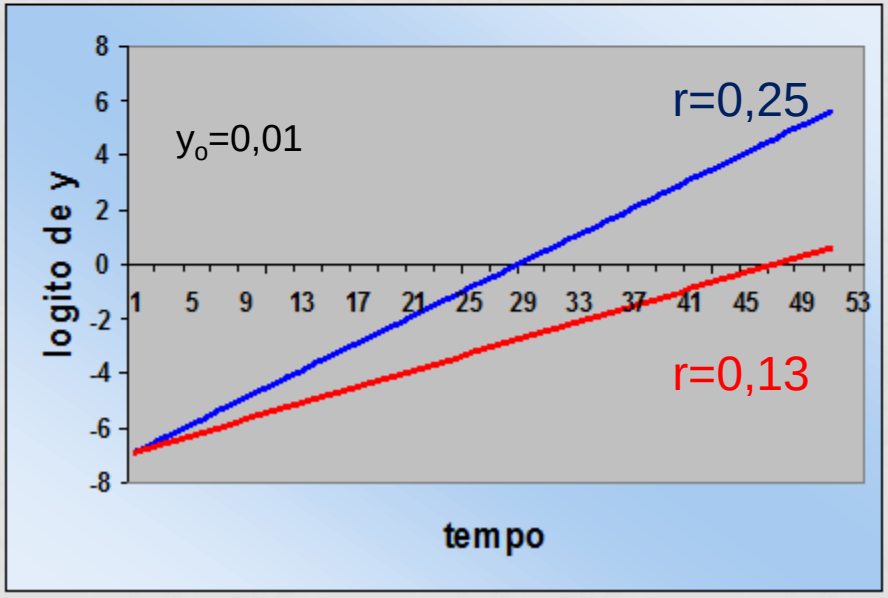
$y = a + bx$

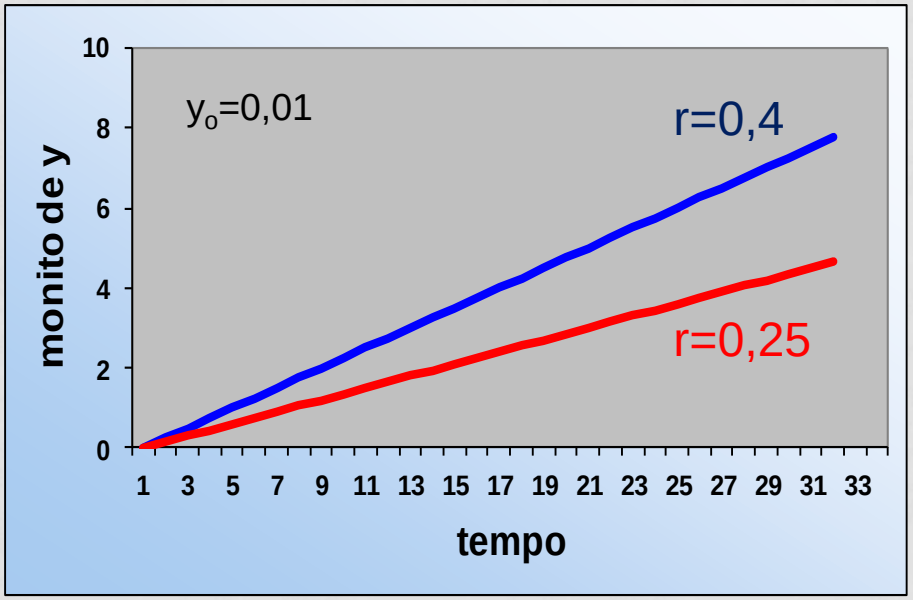



1
0,8
0,6
0,4
0,2
0
proporção de doença
tempo


proporção de doença
1
0,8
0,6
0,4
0,2
0
tempo

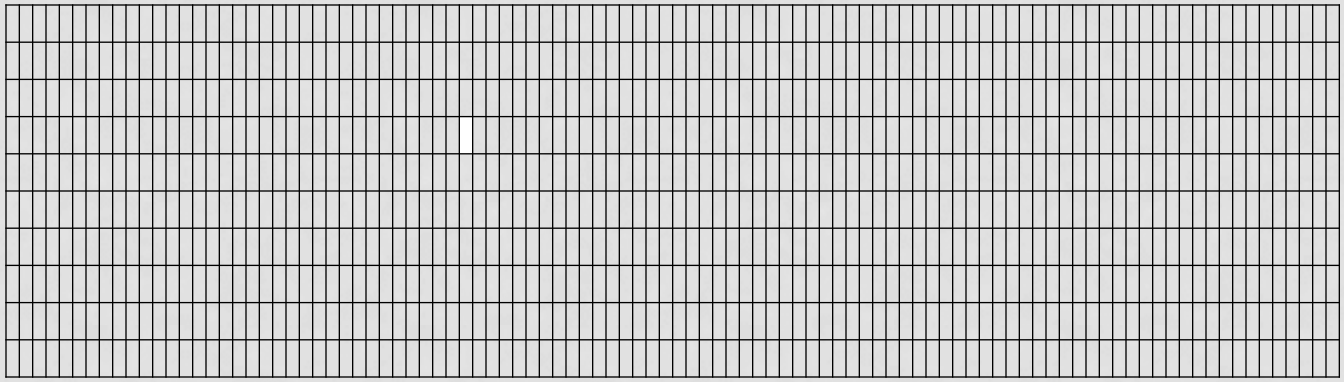

proporção de doença
1
0,8
0,6
0,4
0,2
0
tempo


logito de y
8
6
4
2
0
-2
-4
-6
-8
1
5
9
13
17
21
25
29
33
37
41
45
49
53
y_o=0,01
r=0,25
r=0,13
tempo

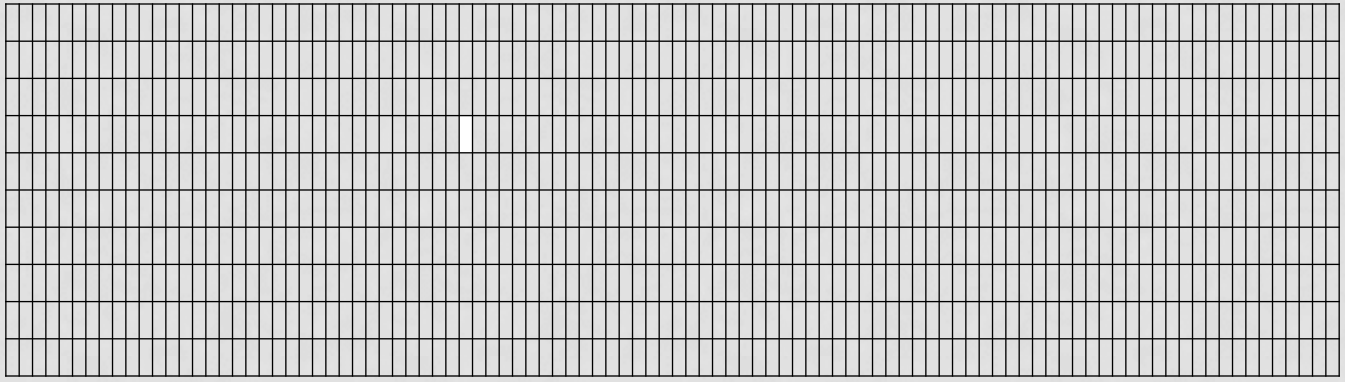

monito de y
10
8
6
4
2
0
1
3
5
7
9
11
13
15
17
19
21
23
25
27
29
31
33
y_o=0,01
r=0,4
r=0,25
tempo

Soja – plantas com ferrugem – parcela com 1000 plantas – 10 linhas de 100 plantas

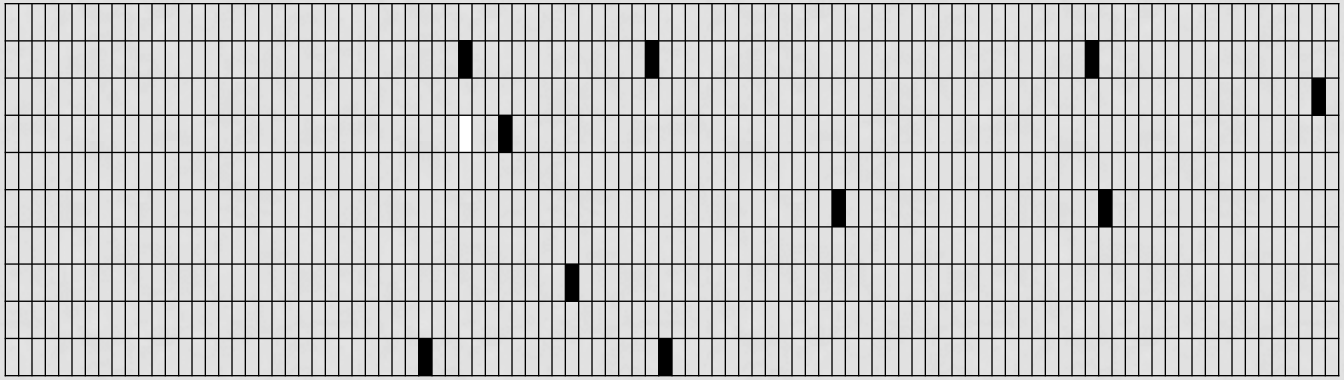
1ª avaliação 12/9/2013



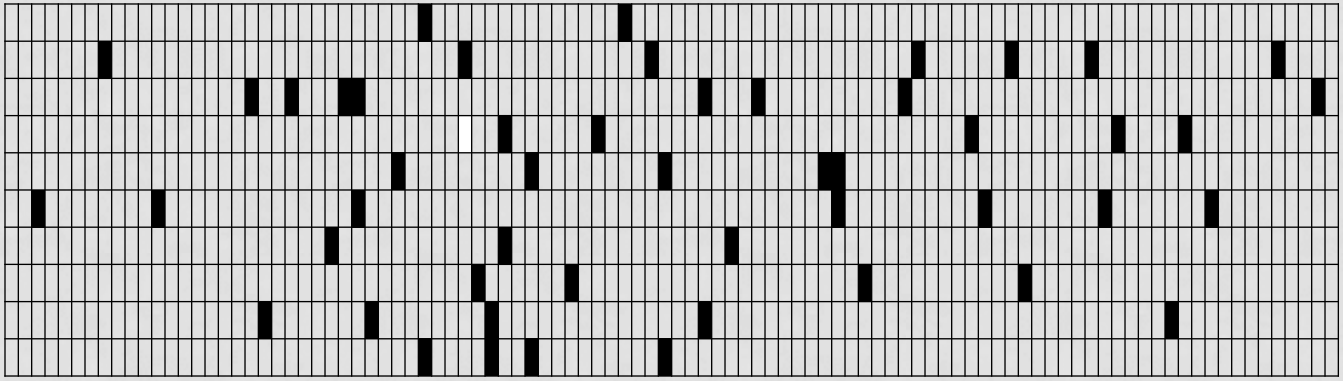
2ª avaliação 22/9/2013



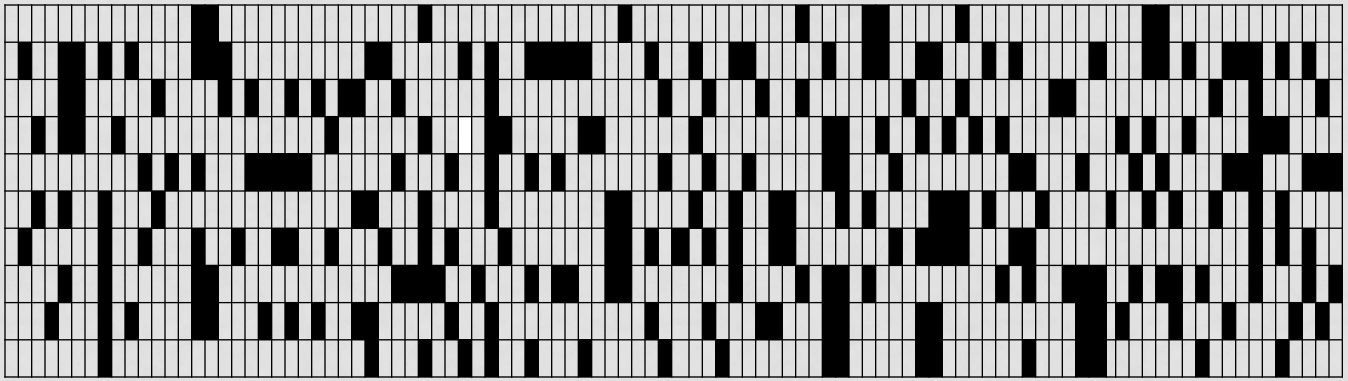
3ª avaliação 02/10/2013 – 10 plantas doentes



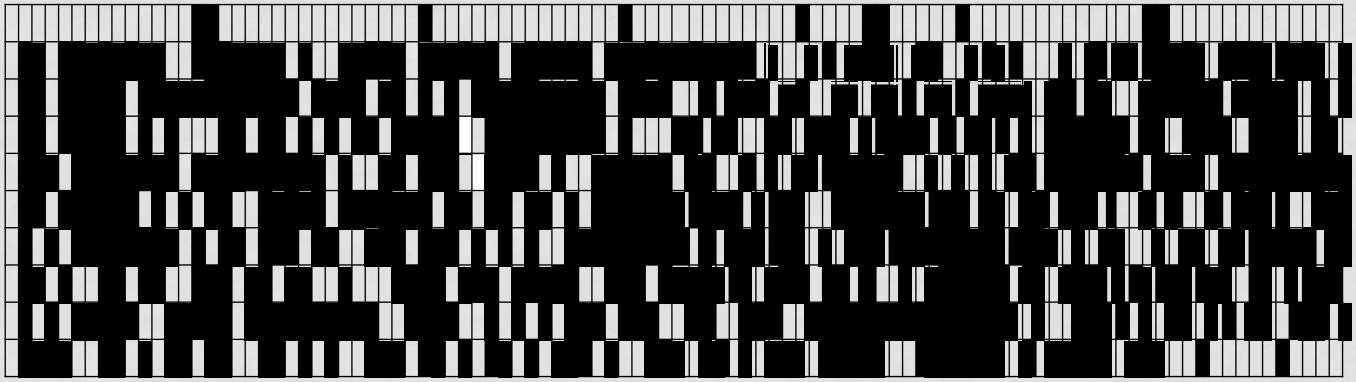
4ª avaliação 12/10/2013 – 50 plantas doentes



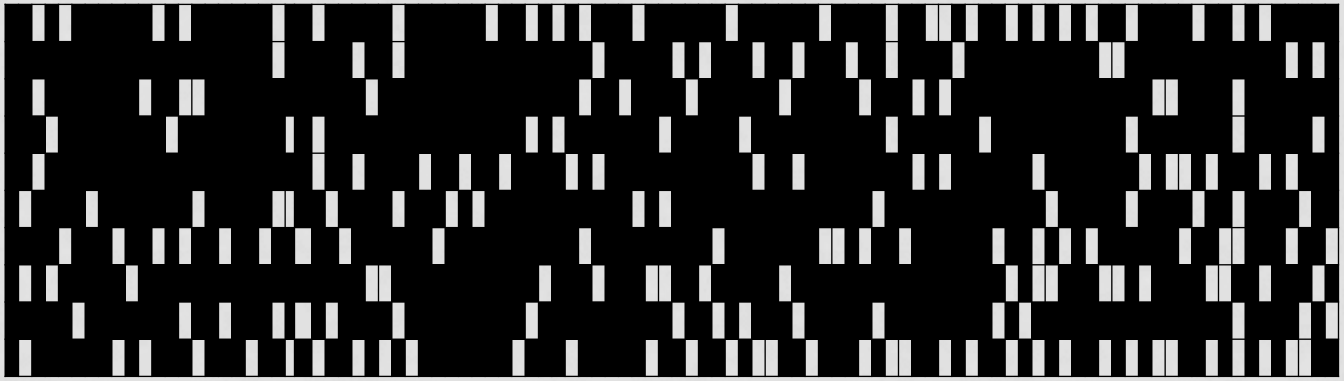
5ª avaliação 12/10/2013 – 220 plantas doentes



6ª avaliação 22/10/2013 – 590 plantas doentes

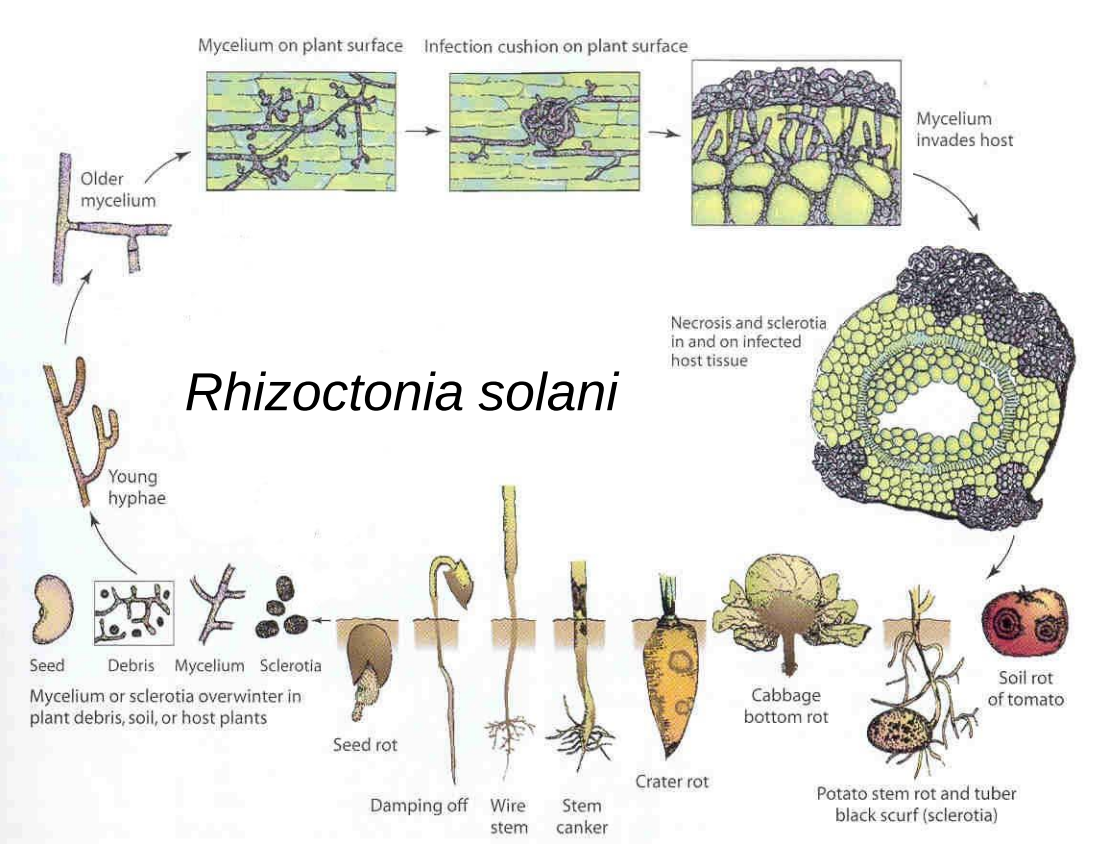


7ª avaliação 01/11/2013 – 850 plantas doentes

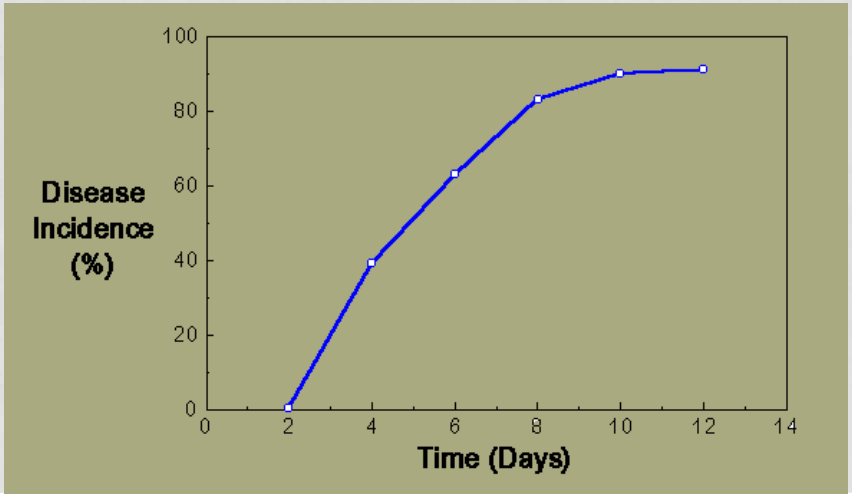


8ª avaliação 11/11/2013 – 955 plantas doentes

Tempo (dias)	Incidência da doença
0	0
10	0
20	10
30	50
40	220
50	590
60	850
70	955

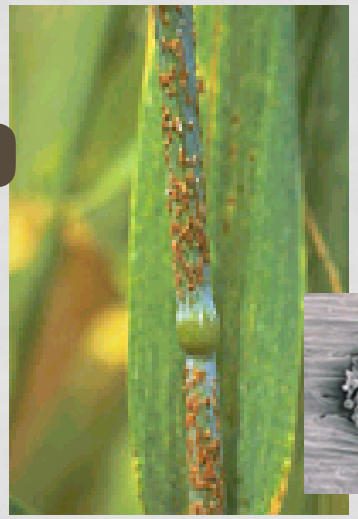


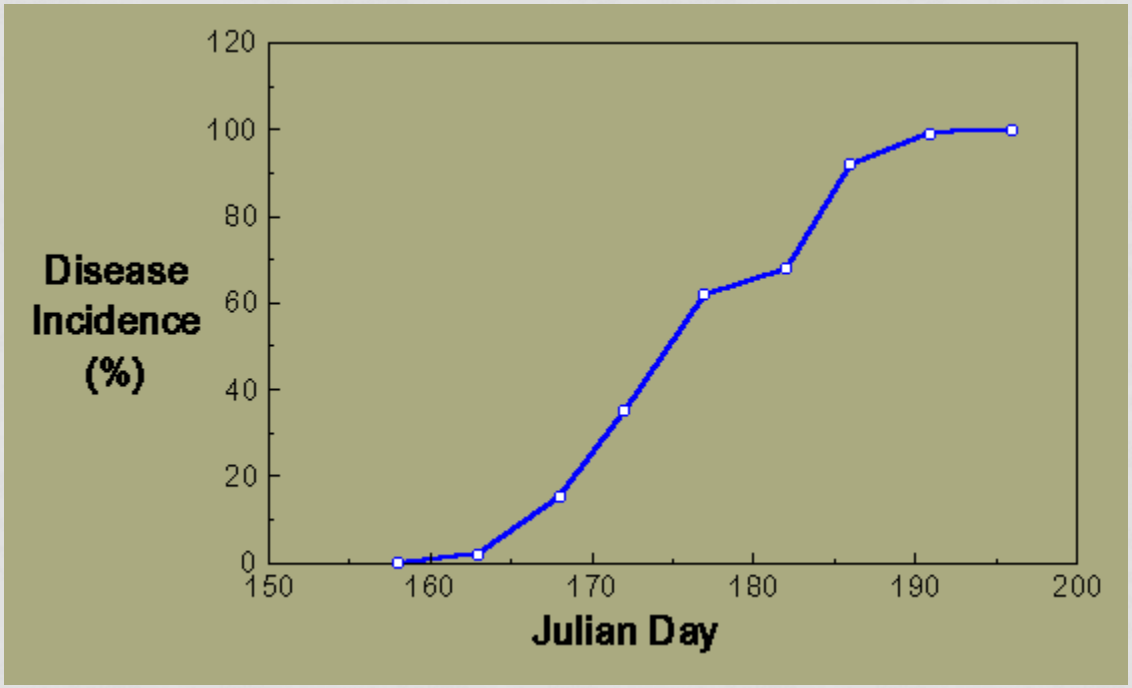
Rhizoctonia solani



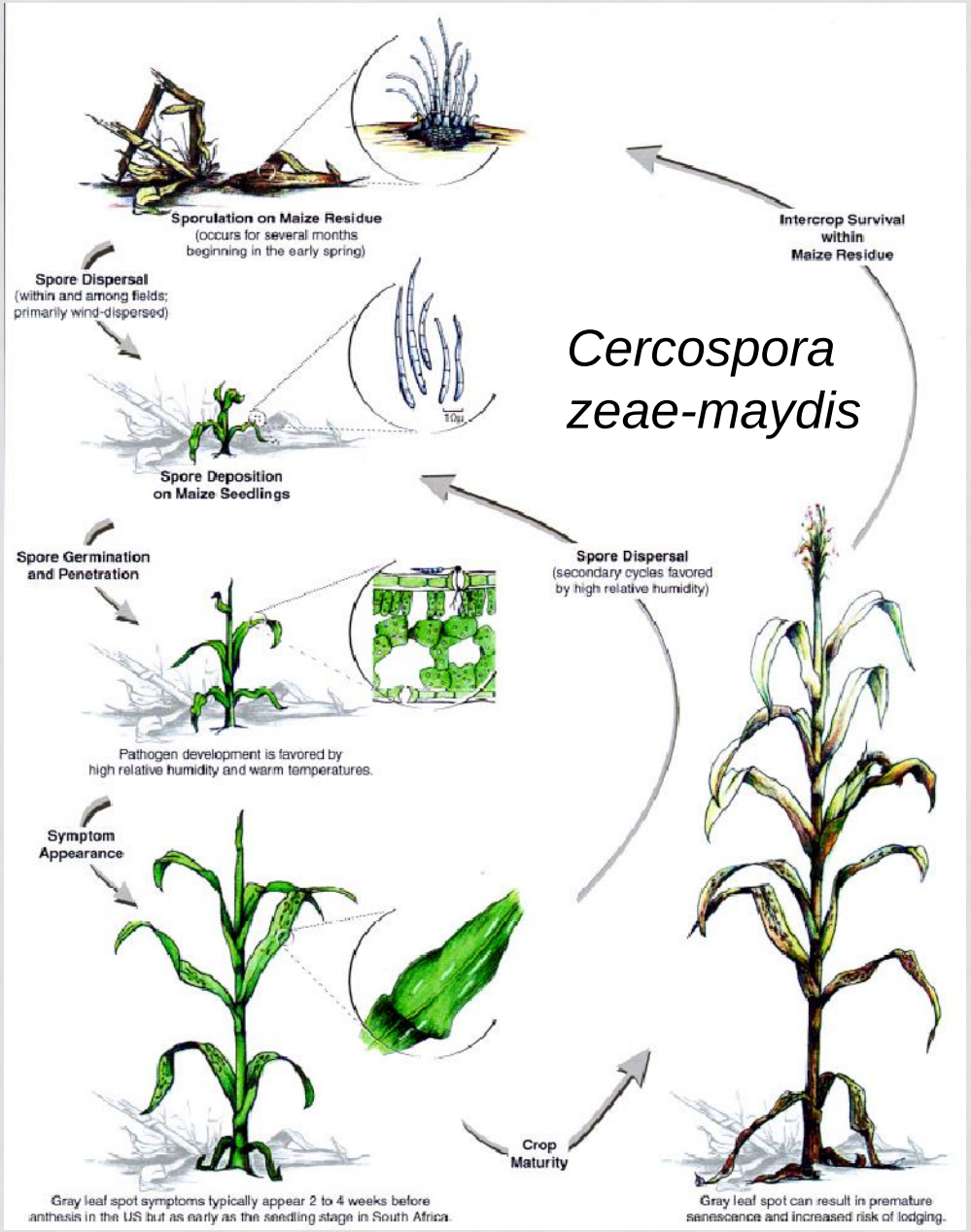
Chet, I. & Baker, R. 1980. Isolation and biocontrol potential of *Trichoderma hamatum* from soil naturally suppressive to *Rhizoctonia solani*. Phytopathology 71:286-290.

Ferrugem do colmo em cereal

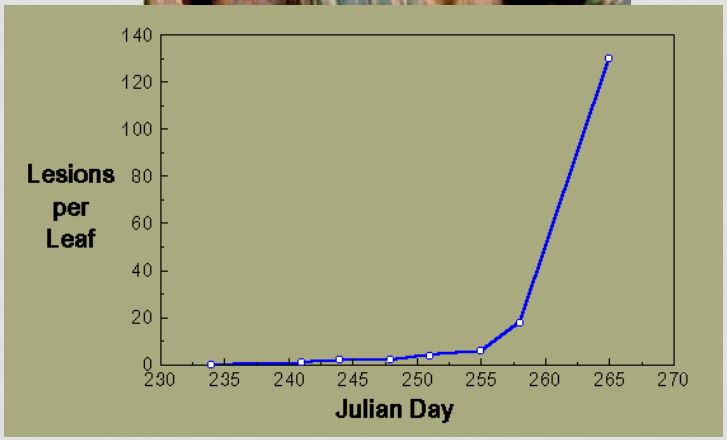




Welty, R. E. & Barker, R. E. 1992. Evaluation of resistance to stem rust in perennial ryegrass grown in controlled and field conditions. Plant Disease 76:637-641.



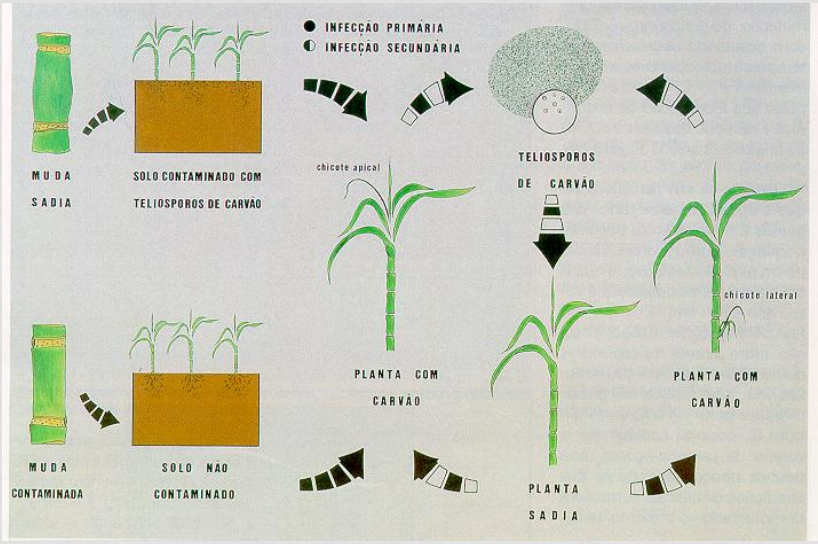
Cercospora zeae-maydis



Rupe, J. C., Siegel, M. R., & Hartman, J. R. 1982. Influence of environment and plant maturity on grey leaf spot of corn caused by *Cercospora zeae-maydis*. Phytopathology 72:1587-1591.

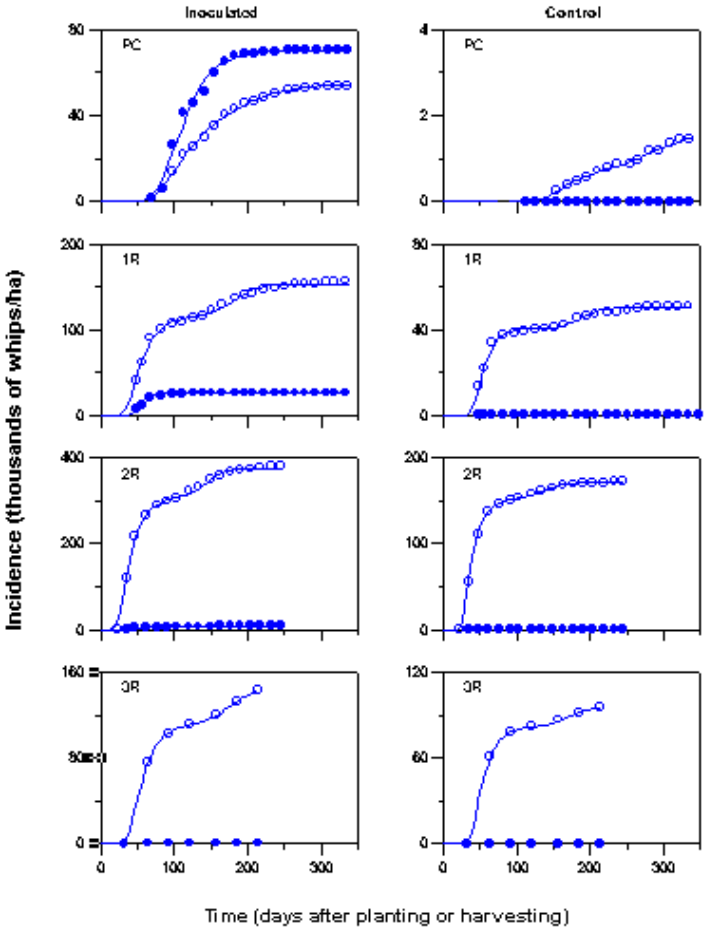
CARVÃO DA CANA-DE-AÇÚCAR

Ustilago scitaminea



CARVÃO DA CANA-DE-AÇÚCAR

Figura 4 - Vista lateral de um talhão com NA56-79 de uma propriedade no oeste do estado de São Paulo, mostrando uma situação de alta infecção de carvão. Cada touceira com chicote recebeu um saco de papel.

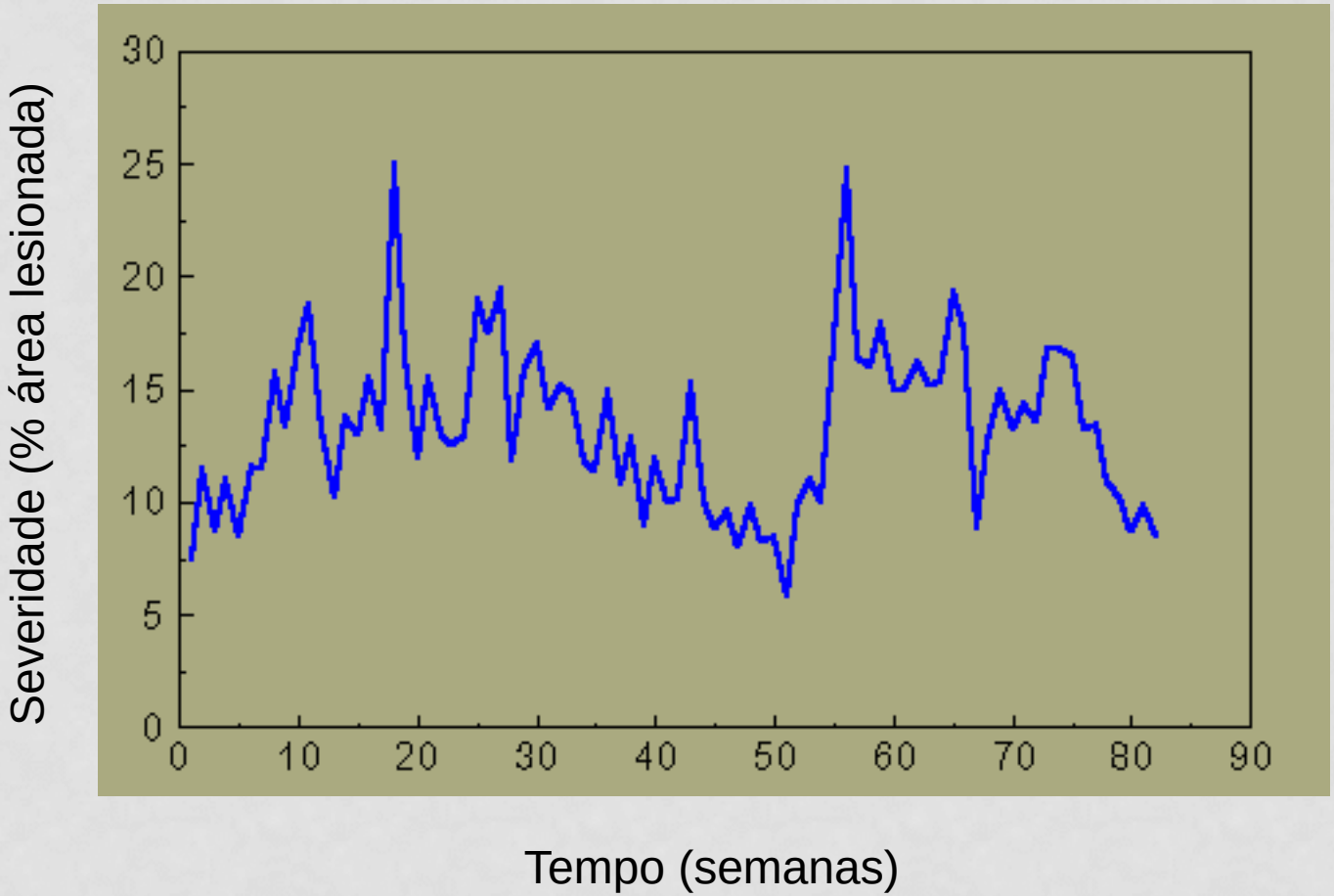


SIGATOKA NEGRA

Mycosphaerela fijiensis

SIGATOKA NEGRA

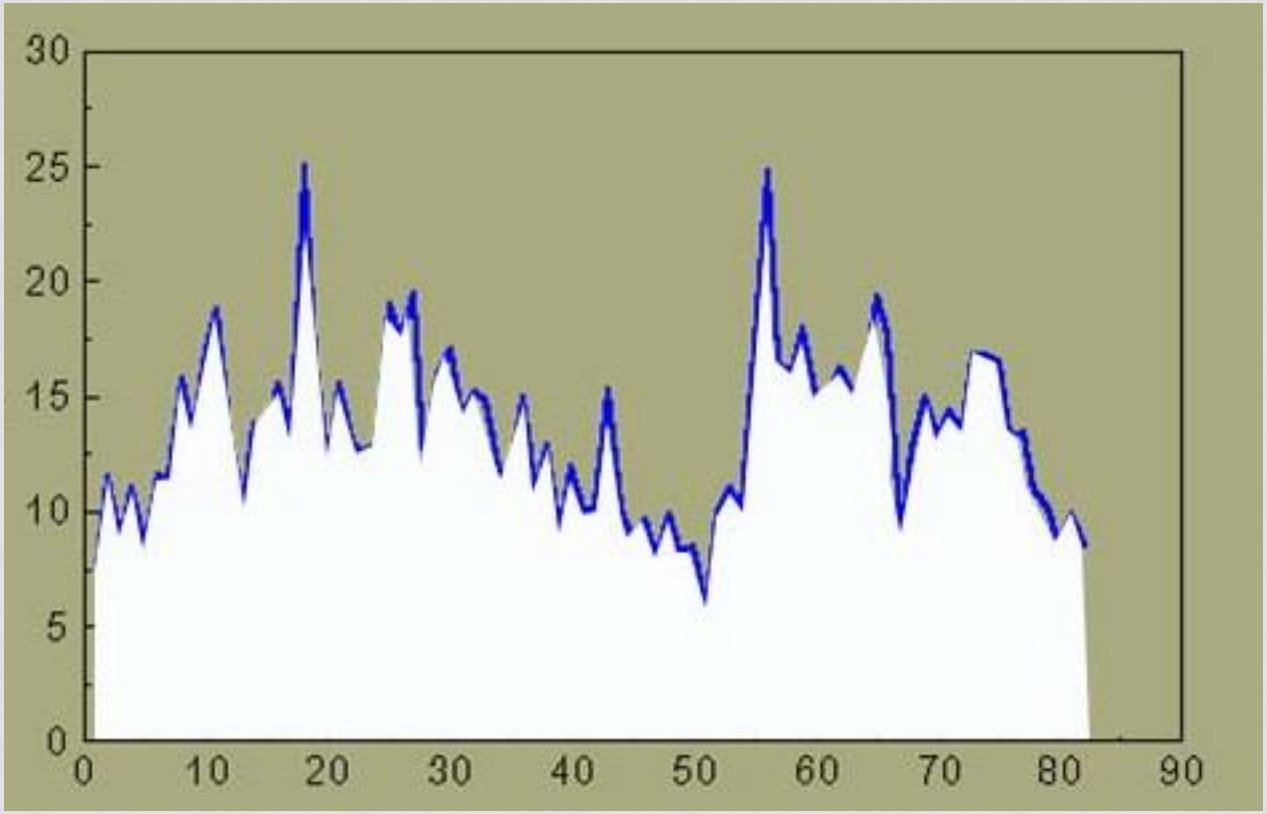
Mycosphaerela fijiensis



(Ramirez, 1988)

SIGATOKA NEGRA

Mycosphaerela fijiensis



Area under disease progress curve (AUDPC)
Área abaixo da curva de progresso da doença (AACPD)

Somatória dos trapézios = $(y_1+y_2)/2*(t_2-t_1)$