

Modelos epidemiológicos. Herramienta en la lucha integrada contra Fitóftora

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Modelo epidemiológico



Representación simplificada de un fenómeno real



Propagación de patógenos en poblaciones
hospedantes



Enfocado a procesos considerados motores
esenciales

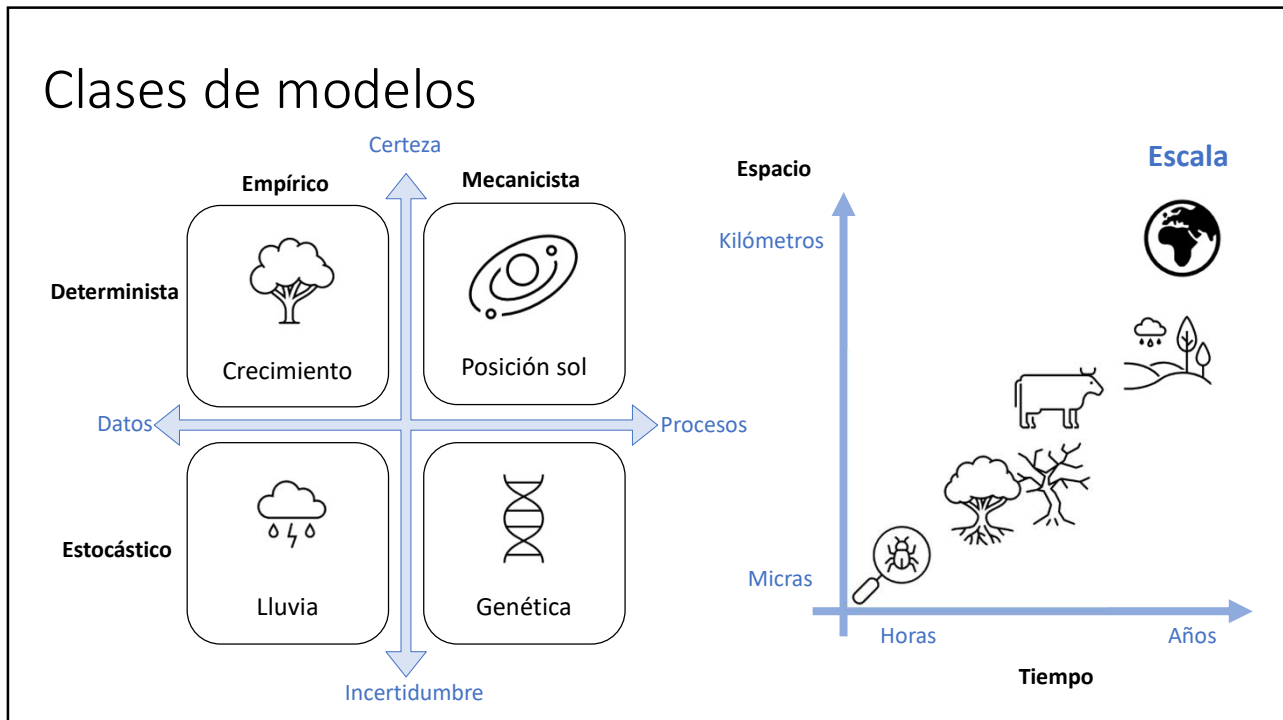


Apoyo de herramientas matemáticas, estadísticas
y computacionales

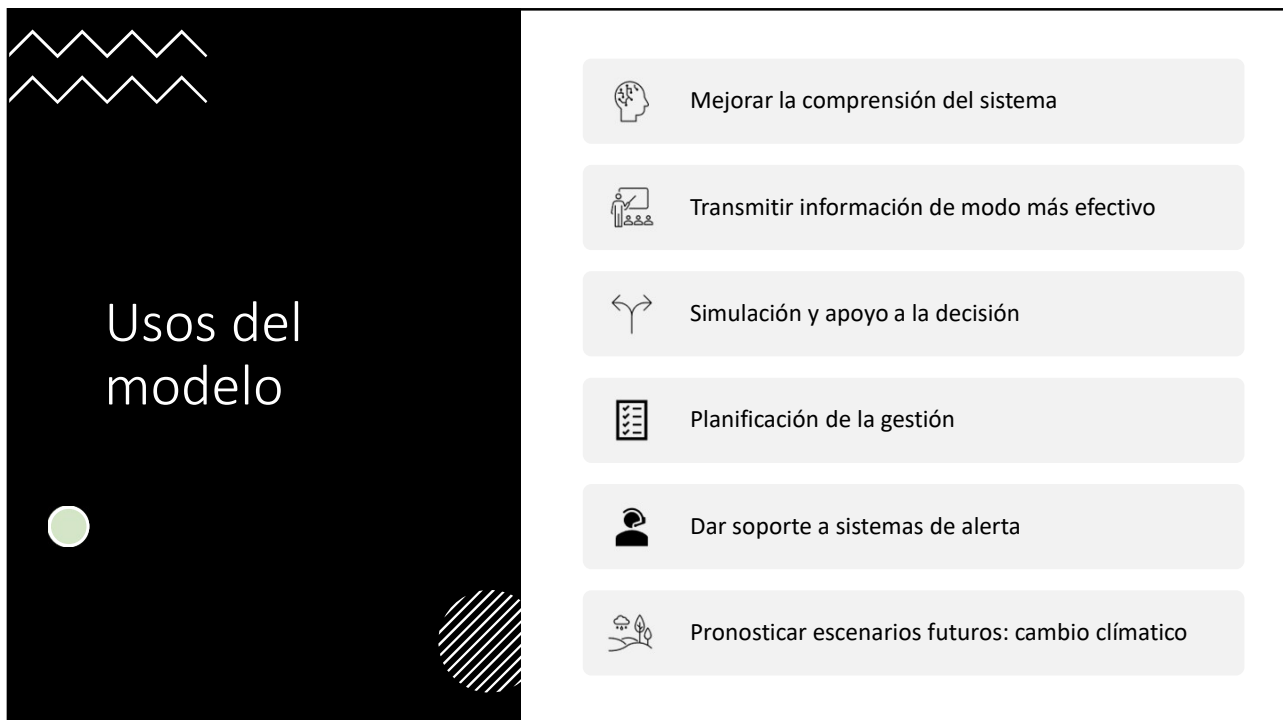


Los resultados siempre serán aproximaciones

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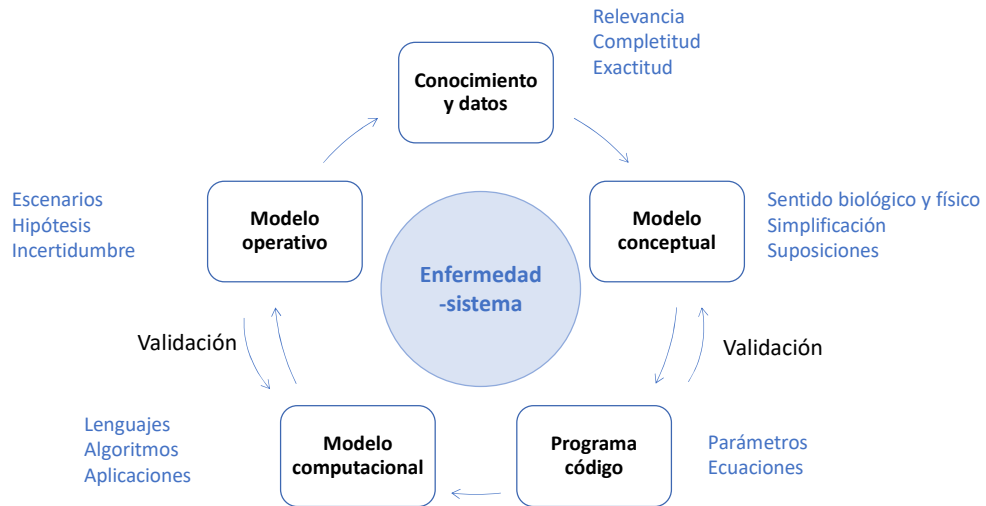


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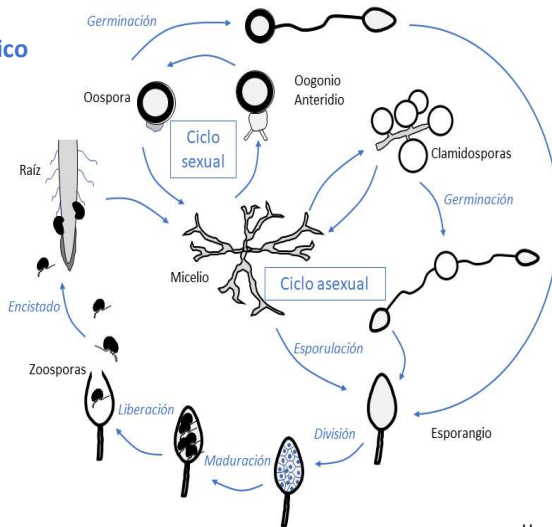
Proceso modelización



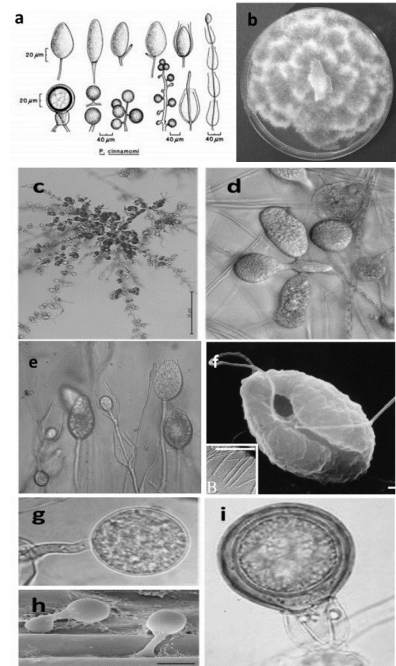
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Conocimiento

Ciclo biológico

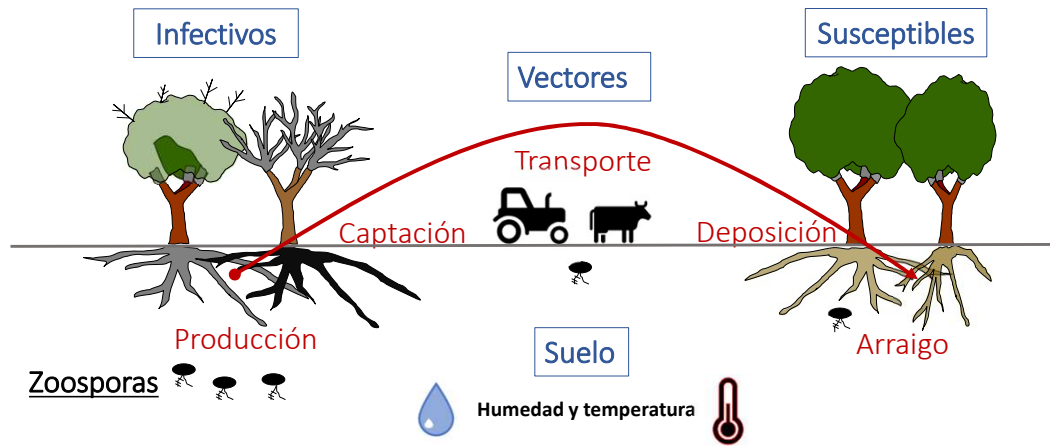


Hardham (2005)



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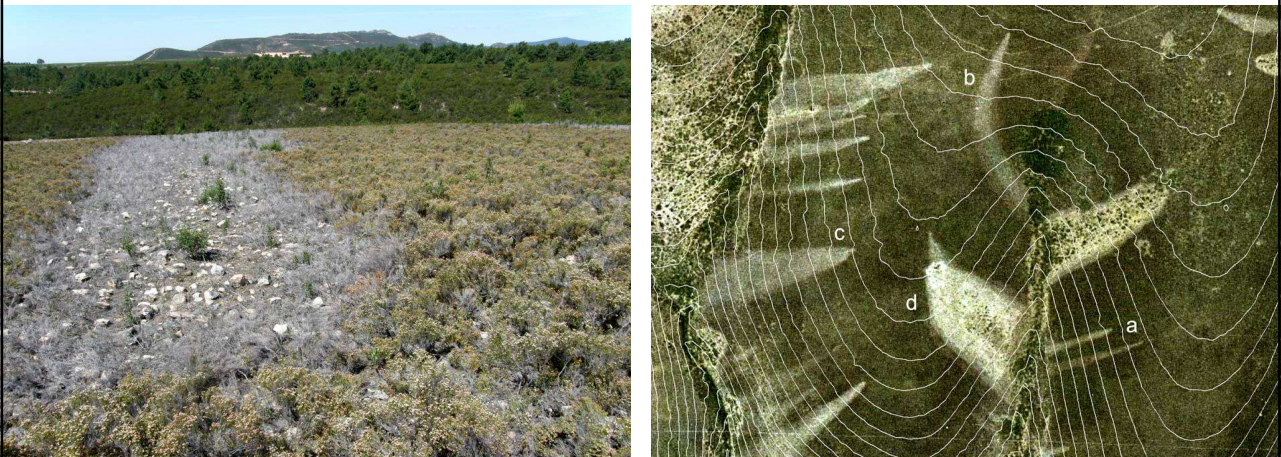
Cadena de infección



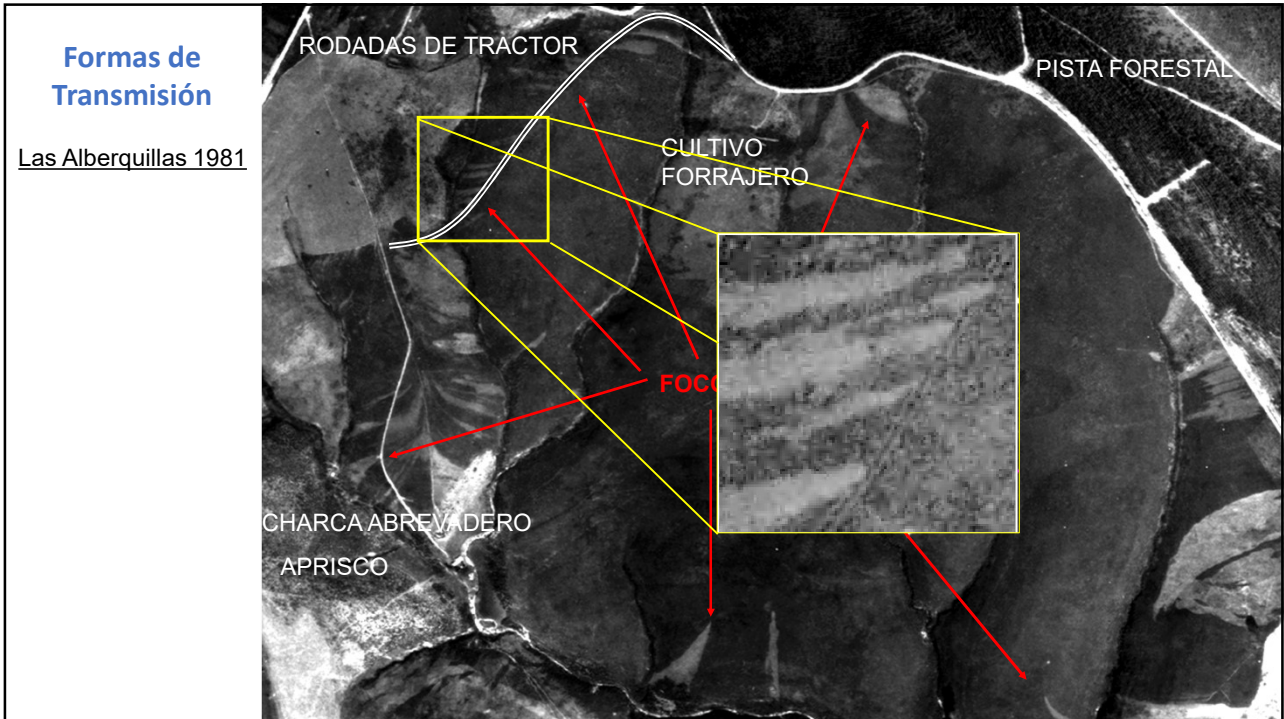
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Datos

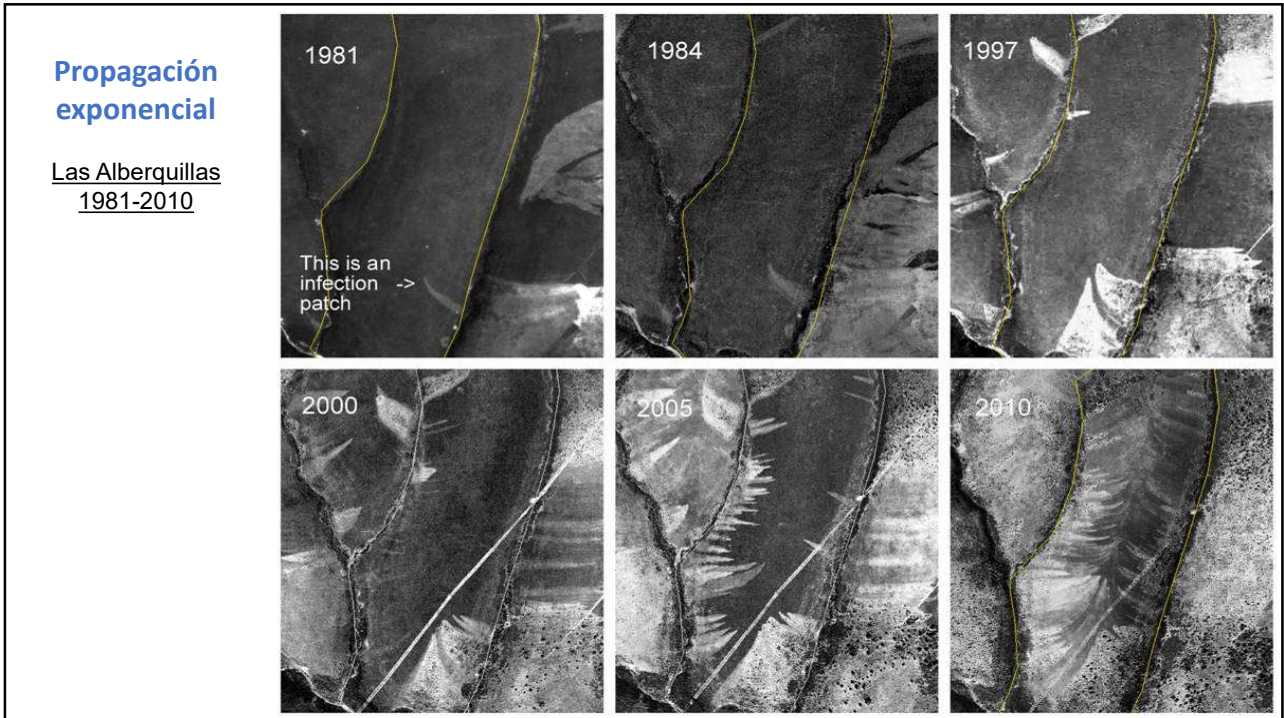
Fitóftora en brezales de la Sierra de Villuercas



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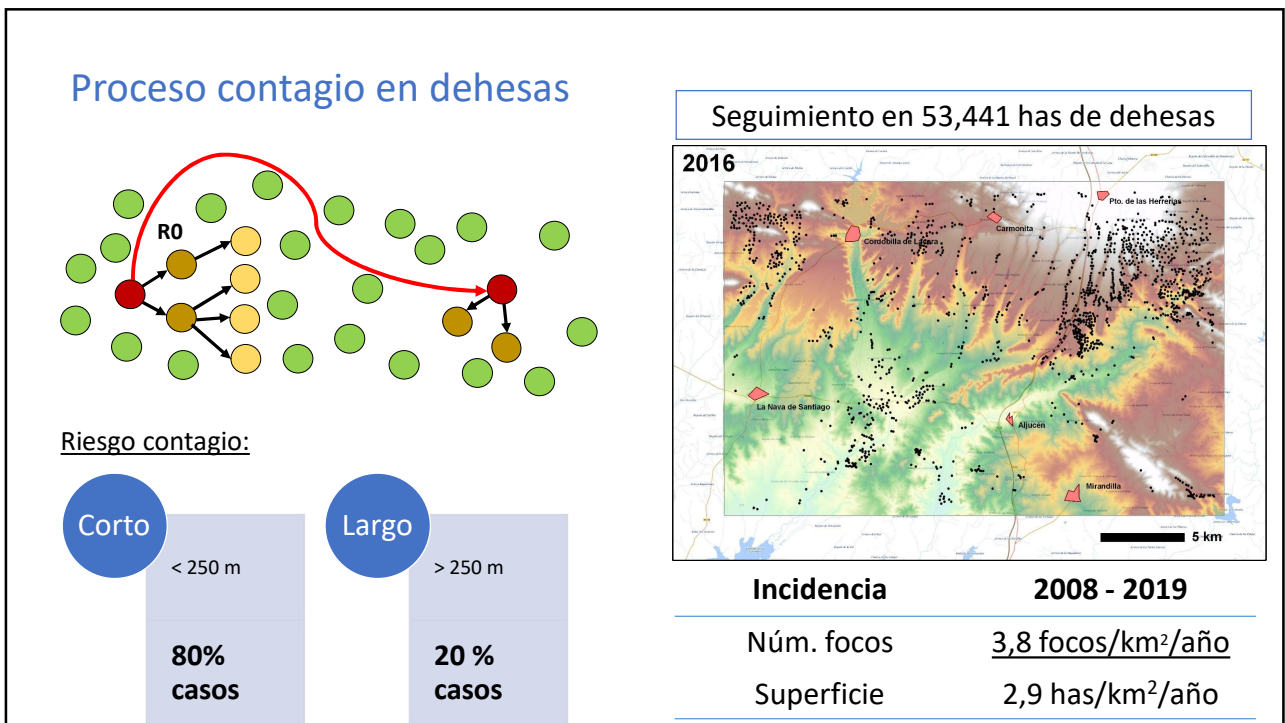
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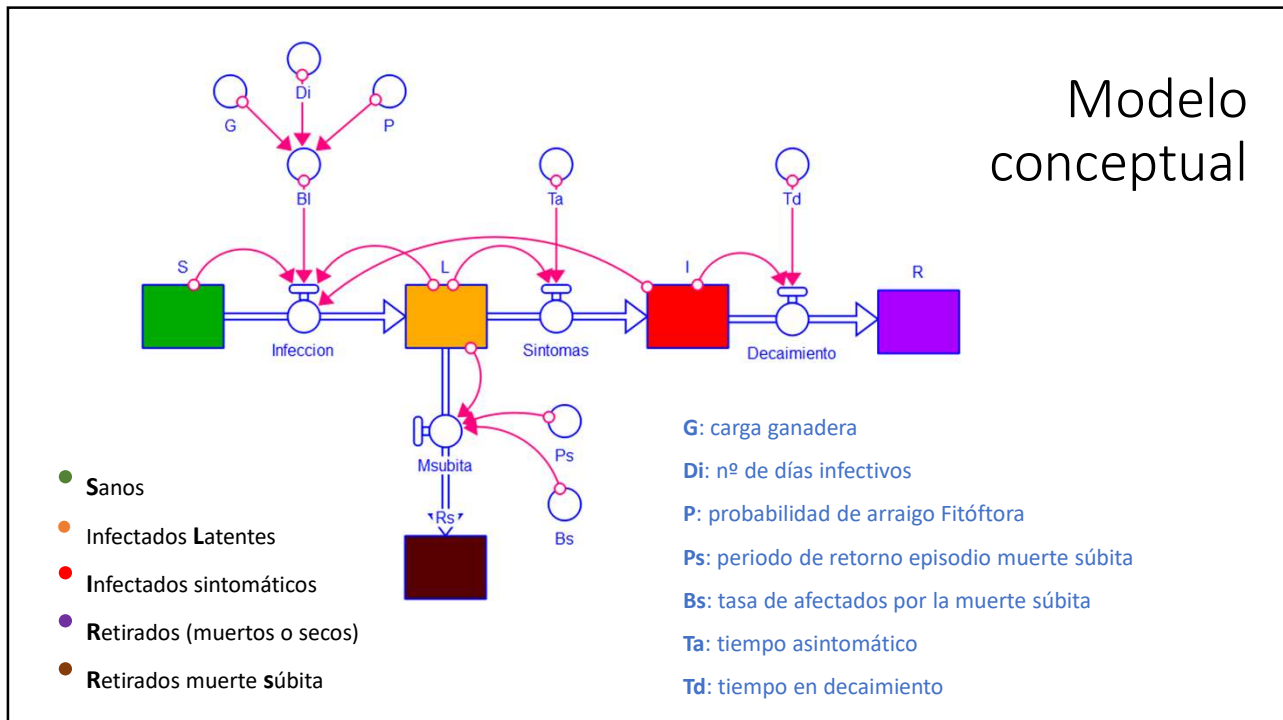
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Ecuaciones y parámetros

$$\frac{dI}{dt} = \frac{1}{T_a}L - \frac{1}{T_d}I$$

$$\frac{dL}{dt} = BI \cdot S(L + I) - \frac{1}{T_a}L - \frac{U}{P_s}B_sL$$

$$\frac{dS}{dt} = -BI \cdot S(L + I)$$

$$\frac{dR}{dt} = \frac{1}{T_d}I$$

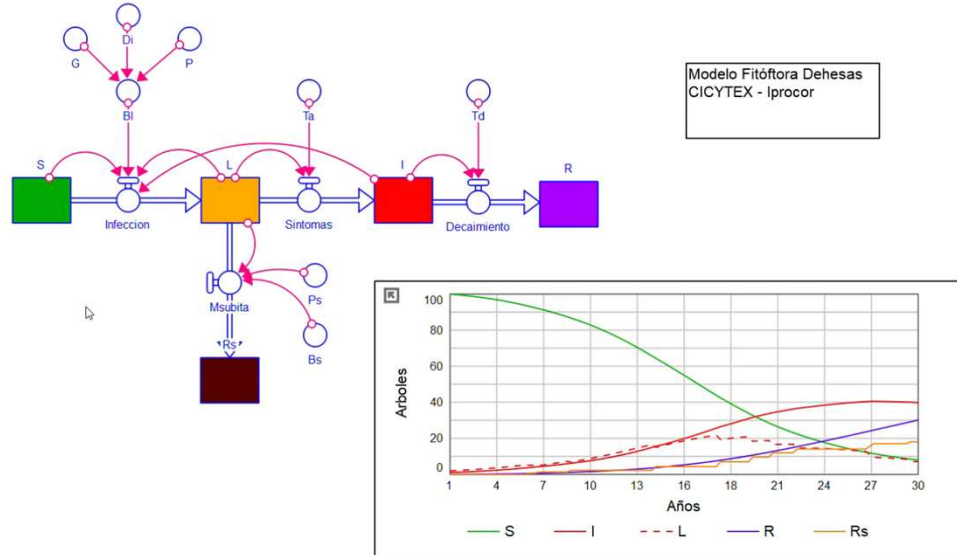
$$\frac{dR_s}{dt} = \frac{U}{P_s}B_sL$$

$$BI = \frac{Di}{365}AP \frac{G}{0.25}$$

Parámetro	Valor	Unidades
B_s	0,5	prob
D_i	60	Días
G	0,25	UGM/Ha
P	0,004	prob
P_s	10	Años
T_a	5	Años
T_d	20	Años

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Modelo computacional



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Modelo operativo

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Simulation Mode:
 Single Multiple Parameter-sweep

Simulation Options:

Show full host information

Run

< play >> +2x Time: Day 0 PAUSED

Hover to interrogate values. Click series labels to turn on/off

- Healthy
- Exposed
- Cryptic
- Detectable
- Infectious
- Disease death
- Natural-death
- Felled

Count vs Time

Status counts			Epidemic Summary Metrics	
Healthy	1998	100%	Duration:	6300.0
Exposed	2	0%	days	
Cryptic	0	0%	Healthy Yield:	48%
Detectable	0	0%	Infected Yield:	2%
Infectious	0	0%	Total Death:	74%
Disease death	0	0%		

The authors request users to cite the [original publication](#) when referring to this simulator, the format or results generated from it. Cunniffe N.J., Stutt R.O.J.H., DeSimone R.E., Gottwald T.R. & Gilligan C.A. (2015) Optimising and communicating options for the control of invasive plant disease when there is epidemiological uncertainty. PLoS Comp. Biol. April 2015

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Proyecto ACICORK



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