

Coffee rust (*Hemileia vastatrix*)

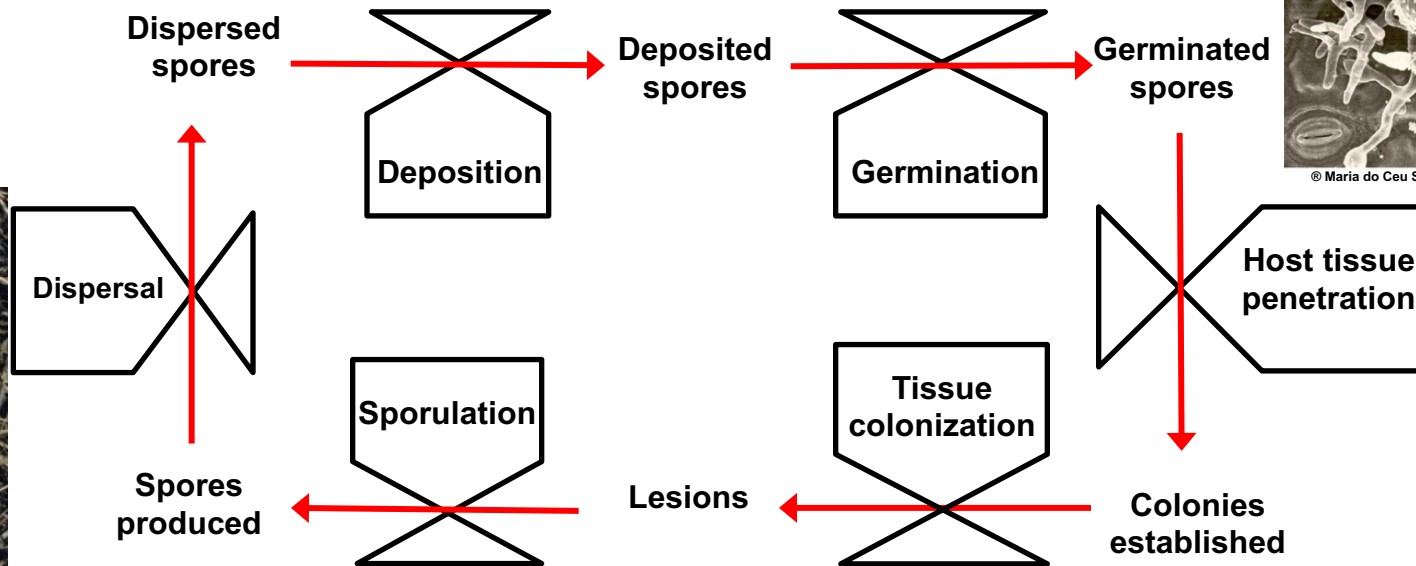
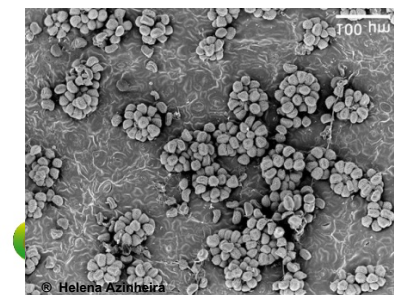
Some biological and epidemiological aspects



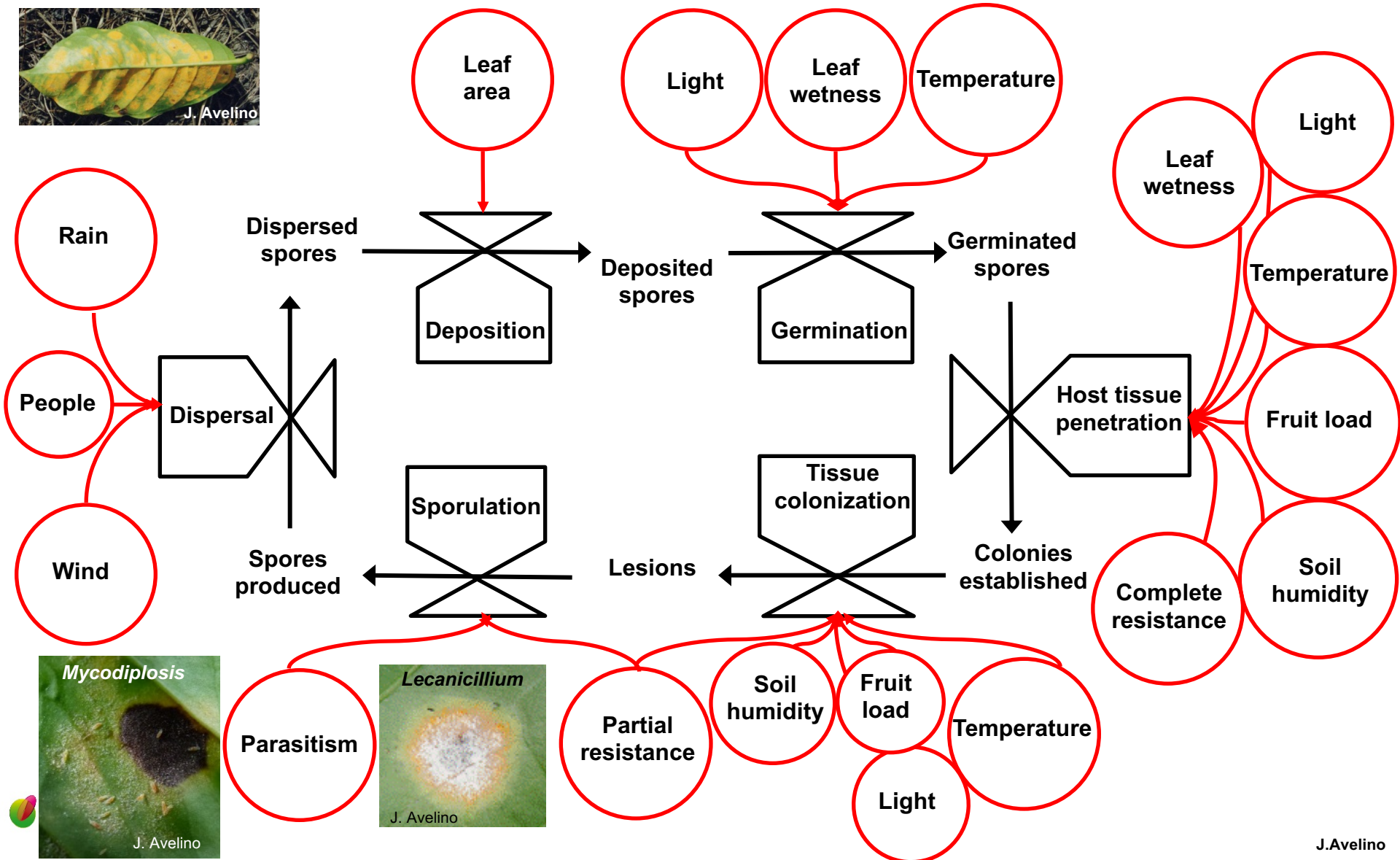
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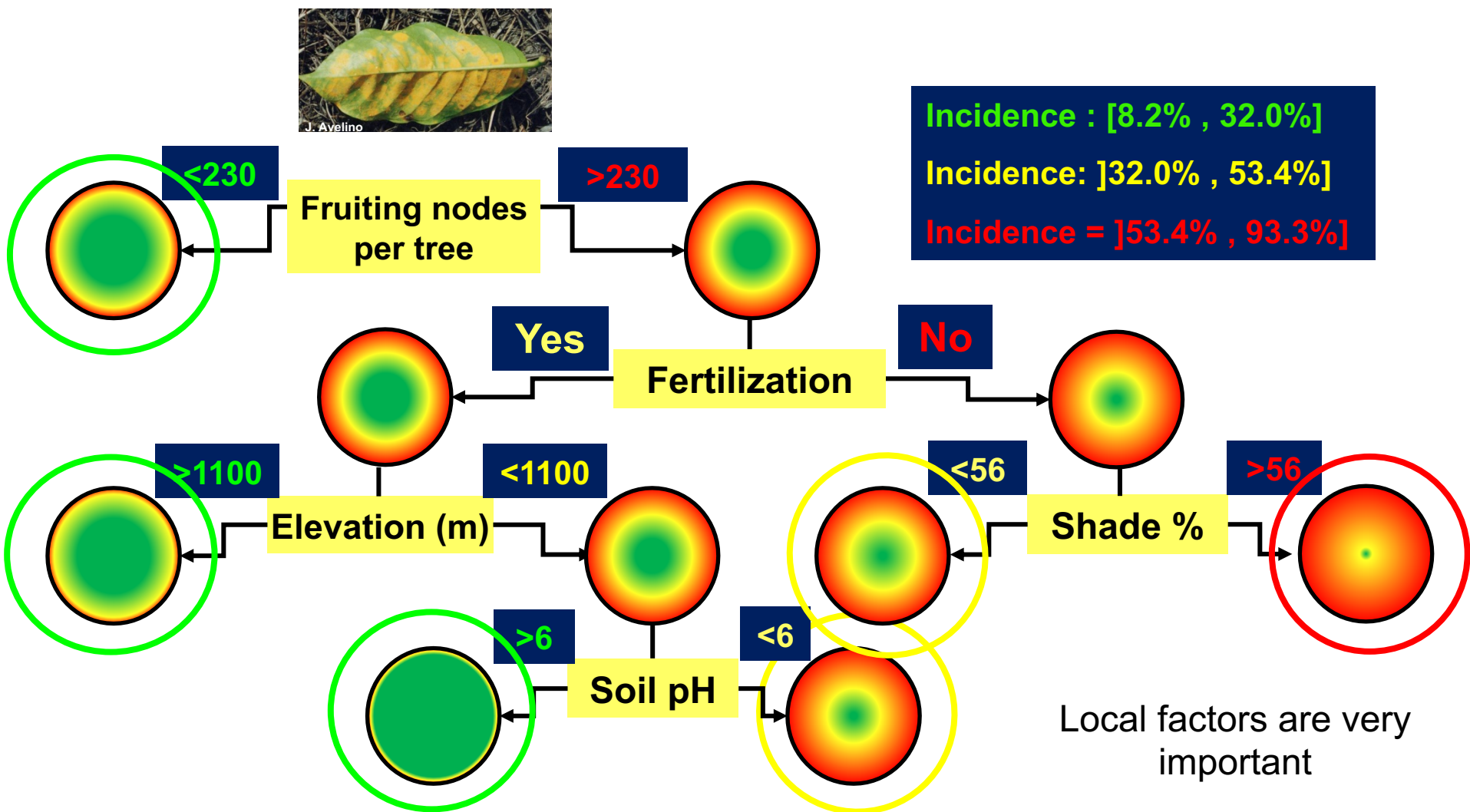
Coffee rust life cycle



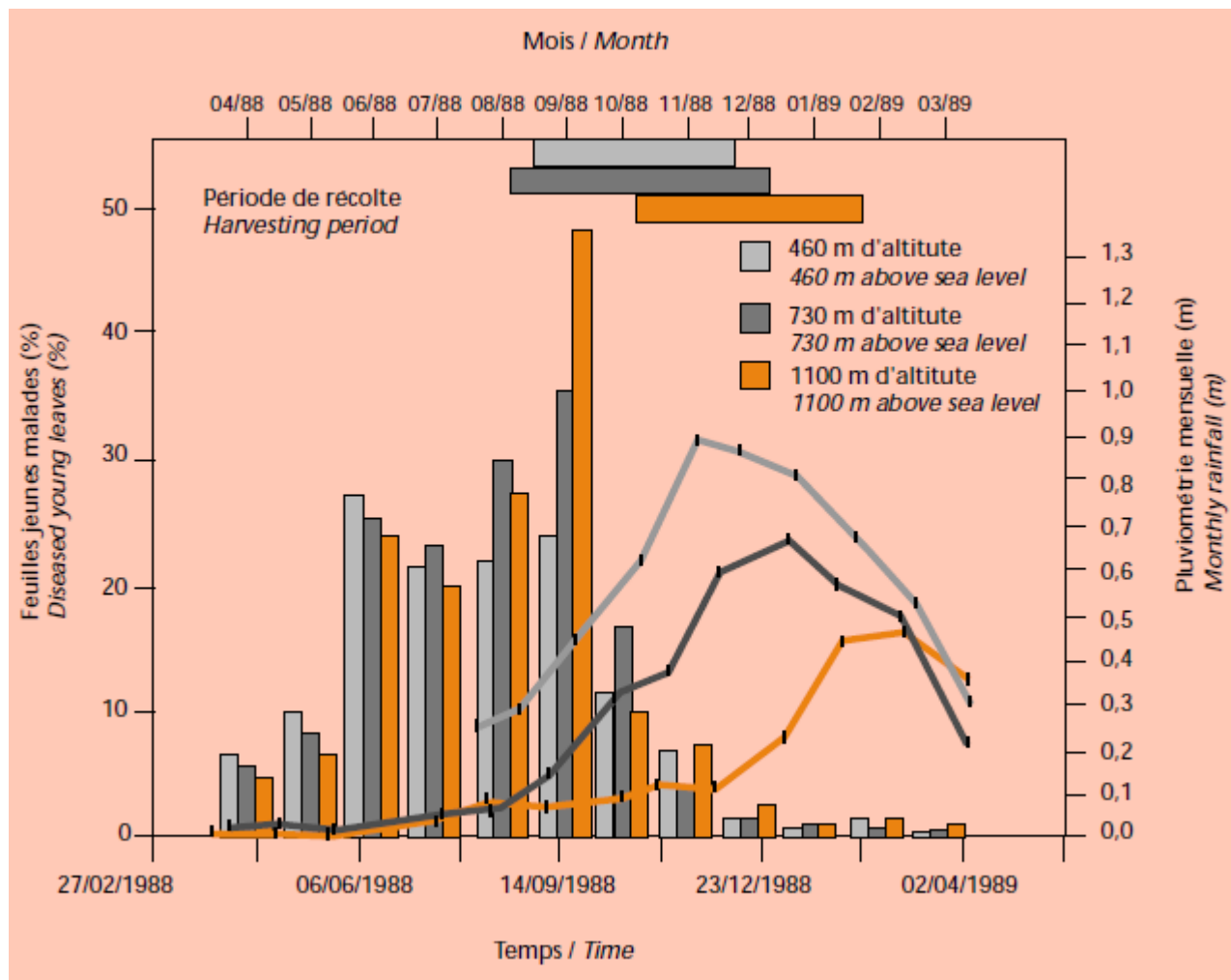
Main factors affecting the coffee rust life cycle (Avelino *et al.*, 2004)



A tool which helps to define risk domains in Honduras (Avelino *et al.*, 2006)



Elevation, rainfall and harvest period effects on the coffee rust progress curve



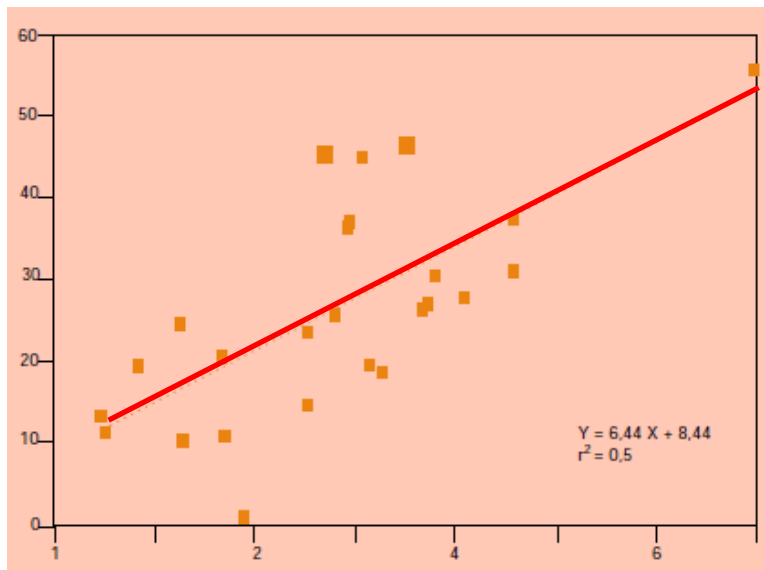
More rust at low altitude

More rainfall does not necessarily mean more rust (spore wash-off)

Coffee rust usually peaks at the end of the harvest, during the dry season

High fruit loads increase coffee rust incidence

Cumulative percentage of leaves with coffee rust at the end of the harvest



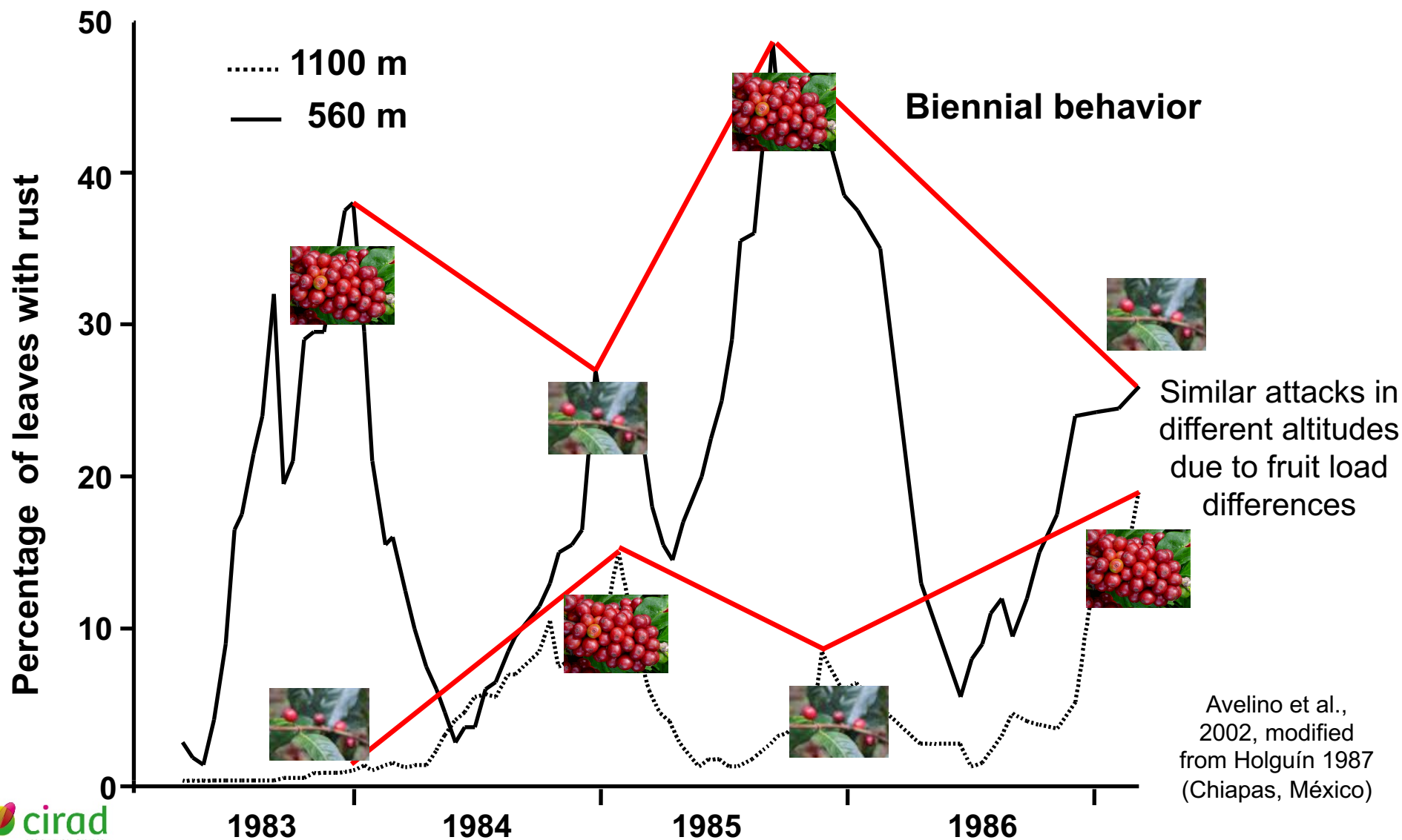
Ratio: number of berries / number of young leaves (in June)



Avelino et al., 2002, modificado de Avelino et al., 1993

Datos de la finca La Libertad, Guatemala, 1990

Coffee rust has a biennial behavior due to fruit load bienniality



		Shade	Author
The pathogen	Dispersal in the air	+/-	Boudrot et al. , 2016 Brenes, 2016
	Splashing	?	Segura, 2016
	Spore conservation after rains	+	Segura, 2016 Avelino et al., 2020
	Deposition	+	Segura, 2016 Avelino et al., 2020
	Germination + penetration	+/-	López-Bravo et al., 2012
	Colonization	=	Brenes, 2016
	Sporulation intensity	+/-	Pico, 2014 Granados, 2015 Brenes, 2016 Segura 2016 Avelino et al., 2020
Natural enemies	Deficiency of Lecanicillium lecanii	-	Merle et al., 2020
The coffee tree	Leaf receptivity	-	Eskes, 1982
	Lifespan of leaves	+	Brenes, 2016
	Fruit load	-	López-Bravo et al., 2012

Shade effects on rust are complex

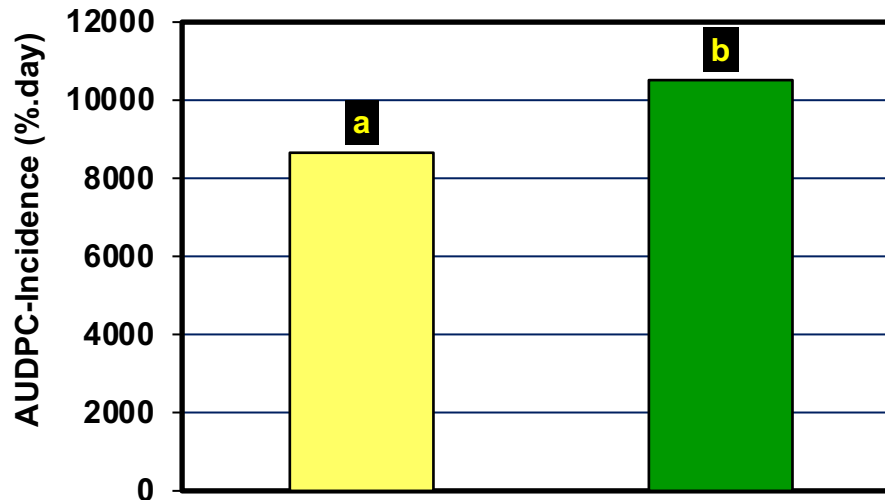
The balance of these effects is unsure;

Shade effects also depend on tree species, their traits, their spatial arrangement, number of strata

+ Increases
- Reduces
= Similar
+/- Interactions

Under standardized fruit loads, shade (*Erythrina poeppigiana*) favors coffee rust

AUDPC Rust Incidence
(% of infected leaves – 2008 and 2009)



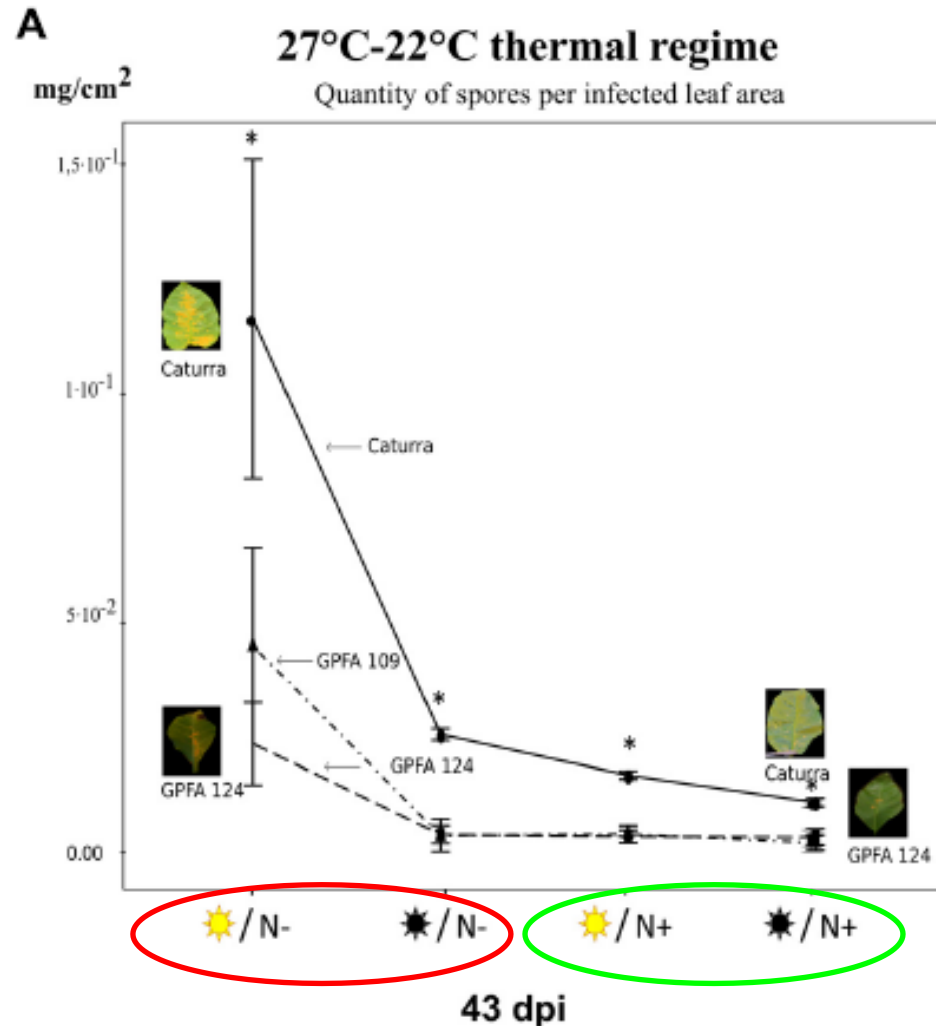
The incidence is higher under shade, partly due to better microclimatic conditions for spore germination and penetration into the leaf



23% of shade cover in 2008 and 57% in 2009

López-Bravo et al., 2012

Nitrogen nutrition (N+) and low light intensity (☀) helps reduce coffee rust sporulation (Toniutti et al., 2017)



Conclusions

Coffee rust impact in Hawai'i will not be uniform; it will mainly depend on elevation and management

There are means to manage coffee rust: good nutrition, soil acidity correction, moderate shade,

But also, fungicides and resistant varieties (could be discussed in another presentation)

Thank you