New tools developed under PLURIFOR

Gonipterus platensis

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CETEMAS
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Gonipterus platensis Marelli

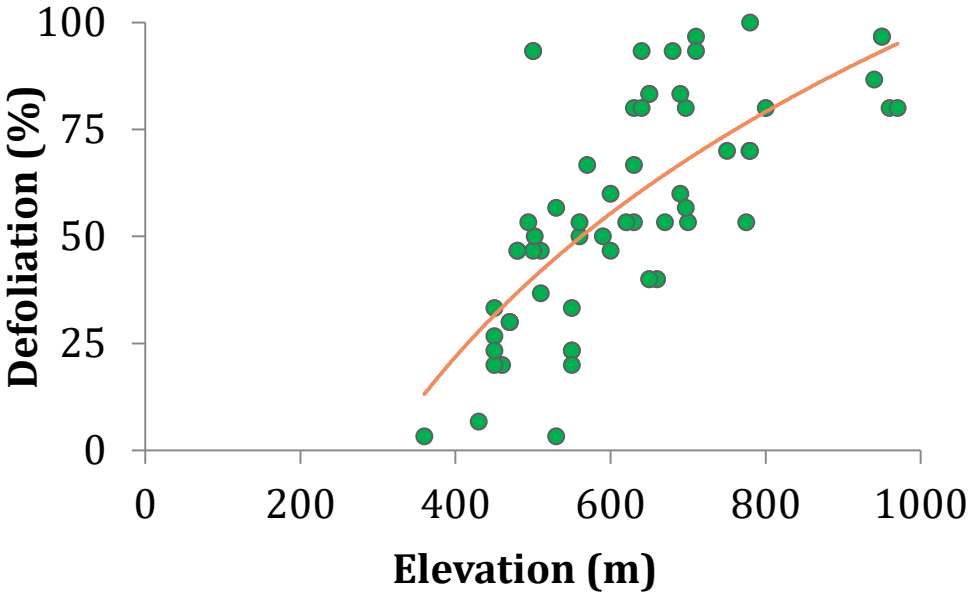
Gonipterus platensis
world distribution

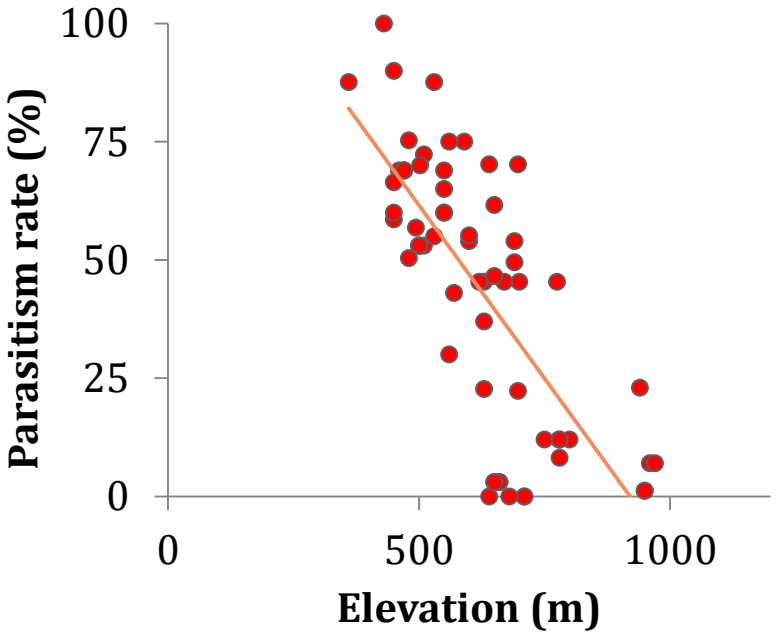
/

How is it controlled worldwide?

The egg parasitoid *Anaphes nitens* (Hym: Mymaridae)

Anaphes nitens efficiency decreases with altitude (lower temperatures)





Reis *et. al*, 2012. Forest Ecology and Management 270: 216–222

In the most affected areas tree defoliation reaches 100%

Economic impact

Gonipterus platensis caused 648 M € wood losses in 20 years!

Still under partial control by *A. nitens*!

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Analysis

Economic Outcome of Classical Biological Control: A Case Study on the *Eucalyptus* Snout Beetle, *Gonipterus platensis*, and the Parasitoid *Anaphes nitens*

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Anticipating biological control in 3 years, resulted in a benefit-cost ratio of 347.

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Transnational Risk management plan – Portugal, Asturias and Cantabria

Describes: Damage, prevention, risk areas, monitoring, control tools and rehabilitation methods.

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Tool – Defoliation assessment using UAVs

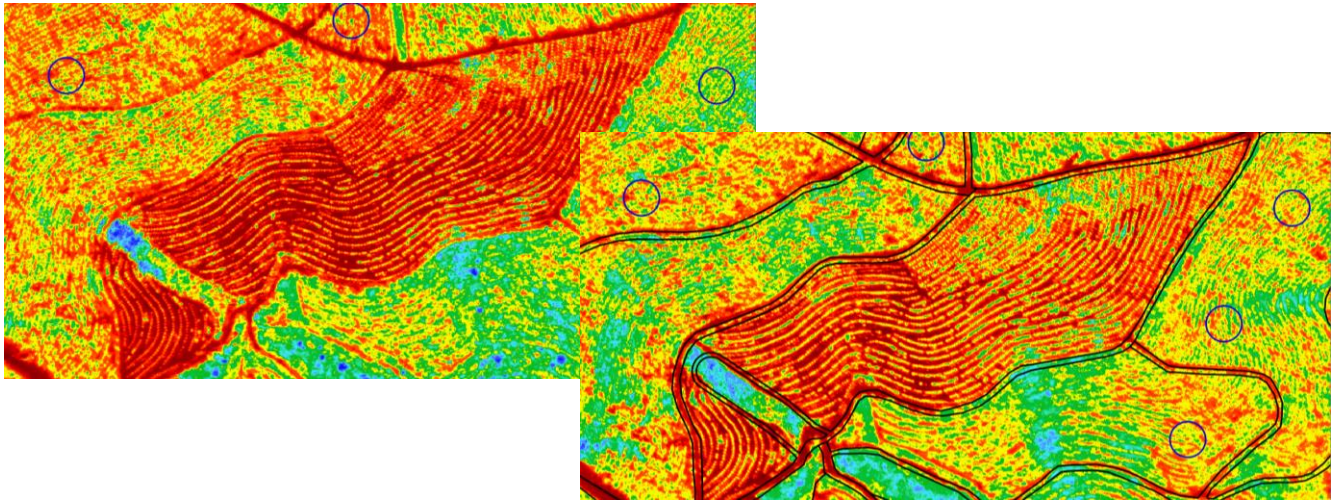
GONIPTERUS PLATENSIS

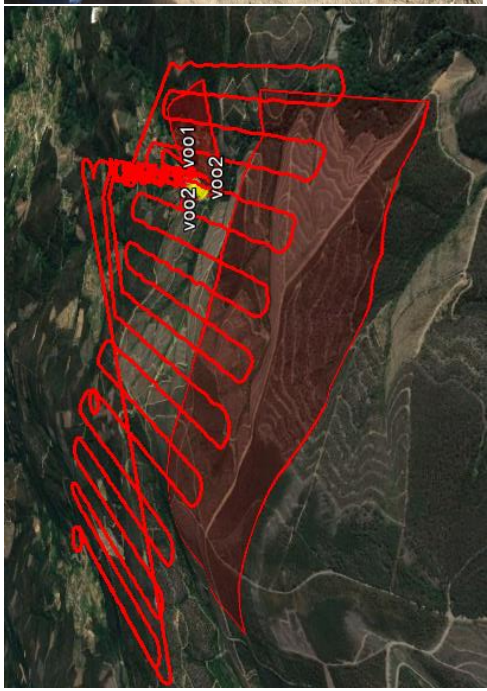
DEFOLIATION ASSESMENT THROUGH MULTISPECTRAL CAMERAS MOUNTED ON UAVs

General information

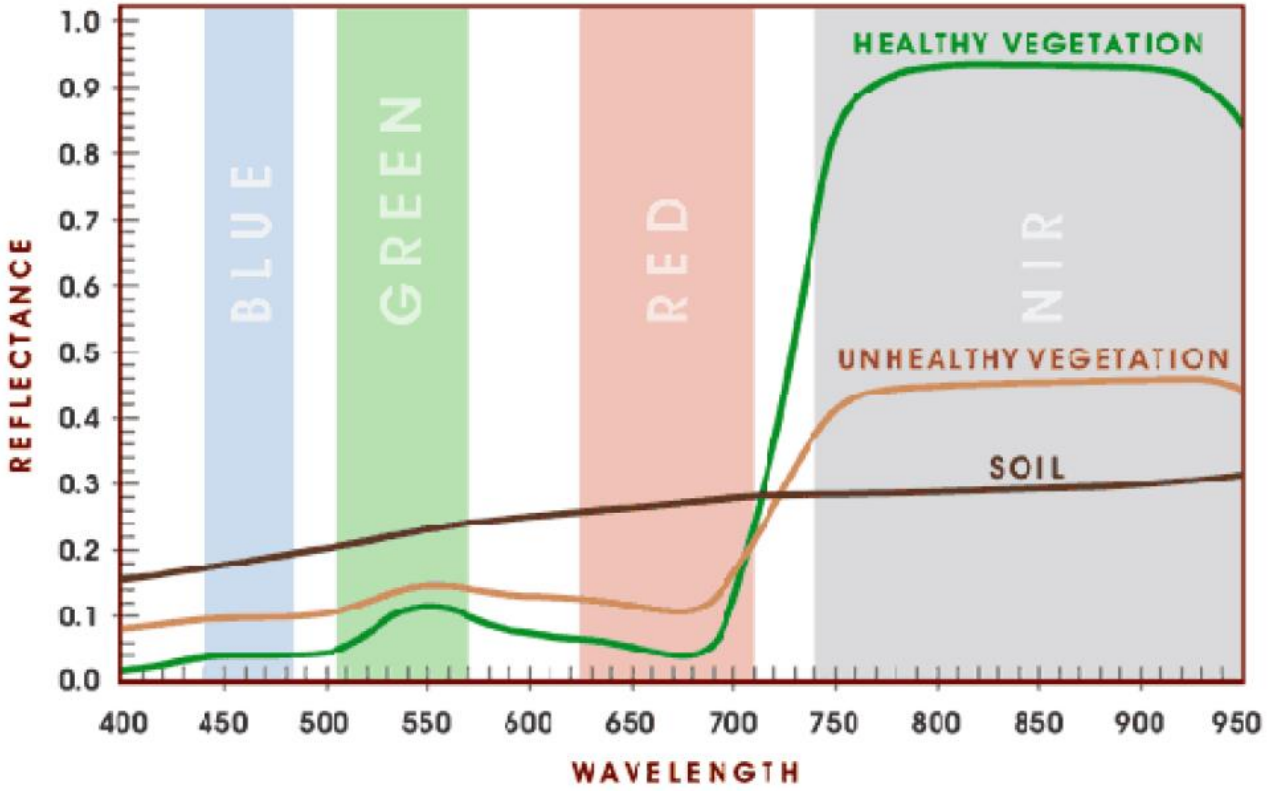
Description	A tool to assess and monitor defoliation in eucalyptus stands

Estimating defoliation using multispectral camera, reflectance measurements (RGB, NIR, RE)





Unhealthy vegetation is detected by characteristic spectral signature and vegetation indexes



	Canon S110	Sequoia
NDVI_MEAN	-0.133	-0.461
GNDVI_MEAN	-0.123	-0.692
IPVI_MEAN	-0.133	-0.461
GCI_MEAN	-0.275	-,711(*)
NLI_MEAN	-0.341	-0.345
NGRDI_MEAN	-0.046	,749(*)
NDRE_MEAN	-0.385	-0.337
REGCI_MEAN	-0.34	-0.331
RENDVI_MEAN	-0.032	-0.181
SAVI_MEAN	-0.238	-0.317
REGNDVI_MEAN	-0.367	-0.706
ARI_MEAN	-0.115	-,713(*)
ARI2_MEAN	-0.38	-,736(*)

Best correlations were obtained with indexes containing the green from Sequoia camera

NOMBRE	FÓRMULA
GCI (Green Chlorophyll Index)	$\frac{\rho_{NIR}}{\rho_{green} - 1}$
NGRDI (Normalized Red Green Difference Vegetation Index)	$\frac{\rho_{green} - \rho_{red}}{\rho_{green} + \rho_{red}}$
ARI (Anthocyanin reflectance index)	$\frac{1}{\rho_{green}} - \frac{1}{\rho_{red\ edge}}$
ARI2 (Anthocyanin reflectance index 2)	$(\frac{1}{\rho_{green}} - \frac{1}{\rho_{red\ edge}})(\mathrm{NIR})$

PLURIFOR

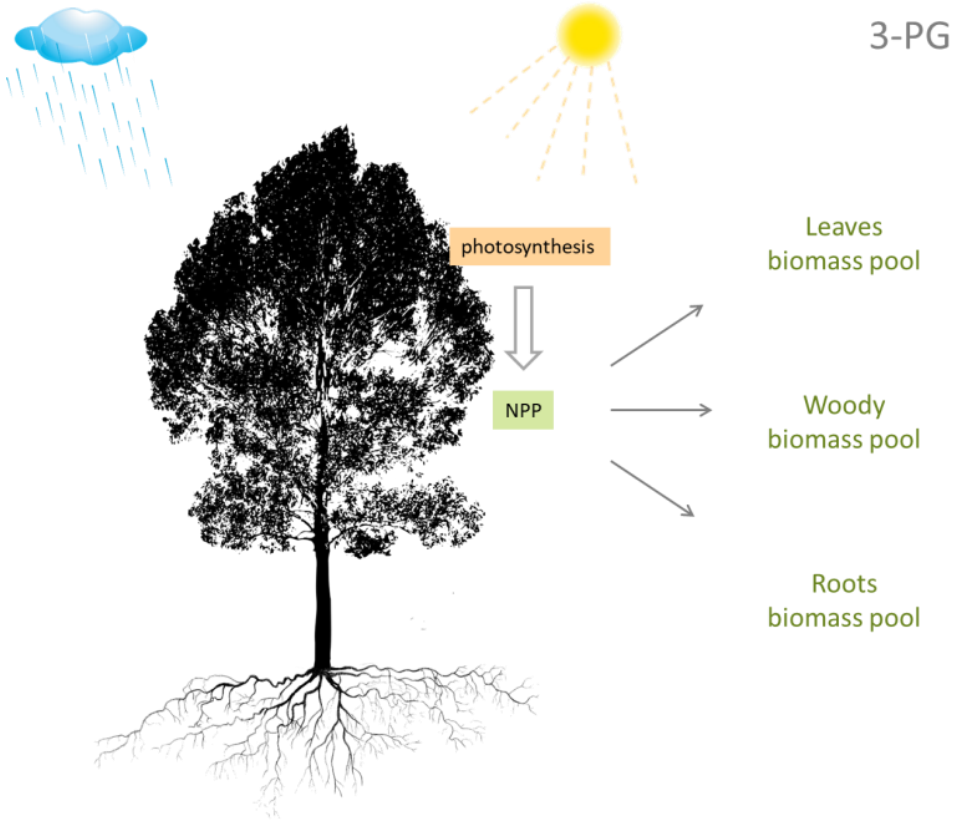
Tool - Estimating wood loss using 3PG model

GONIPTERUS PLATENSIS

DEFOLIATION IMPACT SIMULATION USING THE 3PG MODEL

General information

Description	A tool to predict the impact of defoliation in eucalyptus stands productivity and wood production



Estimating wood loss using 3PG model

What we can simulate?

Different defoliation scenarios (e.g. 25%, 50%, 75%, 100%)

Monthly distribution of defoliation

Years of defoliation

Effect of treatments (e.g. insecticide, augmentative biological control)

Cost- benefit analysis → decision support tool

Example

Starting: 6 months

1st defoliation: 18 months

Defoliation scenarios 3-PG

Desfolha Anual

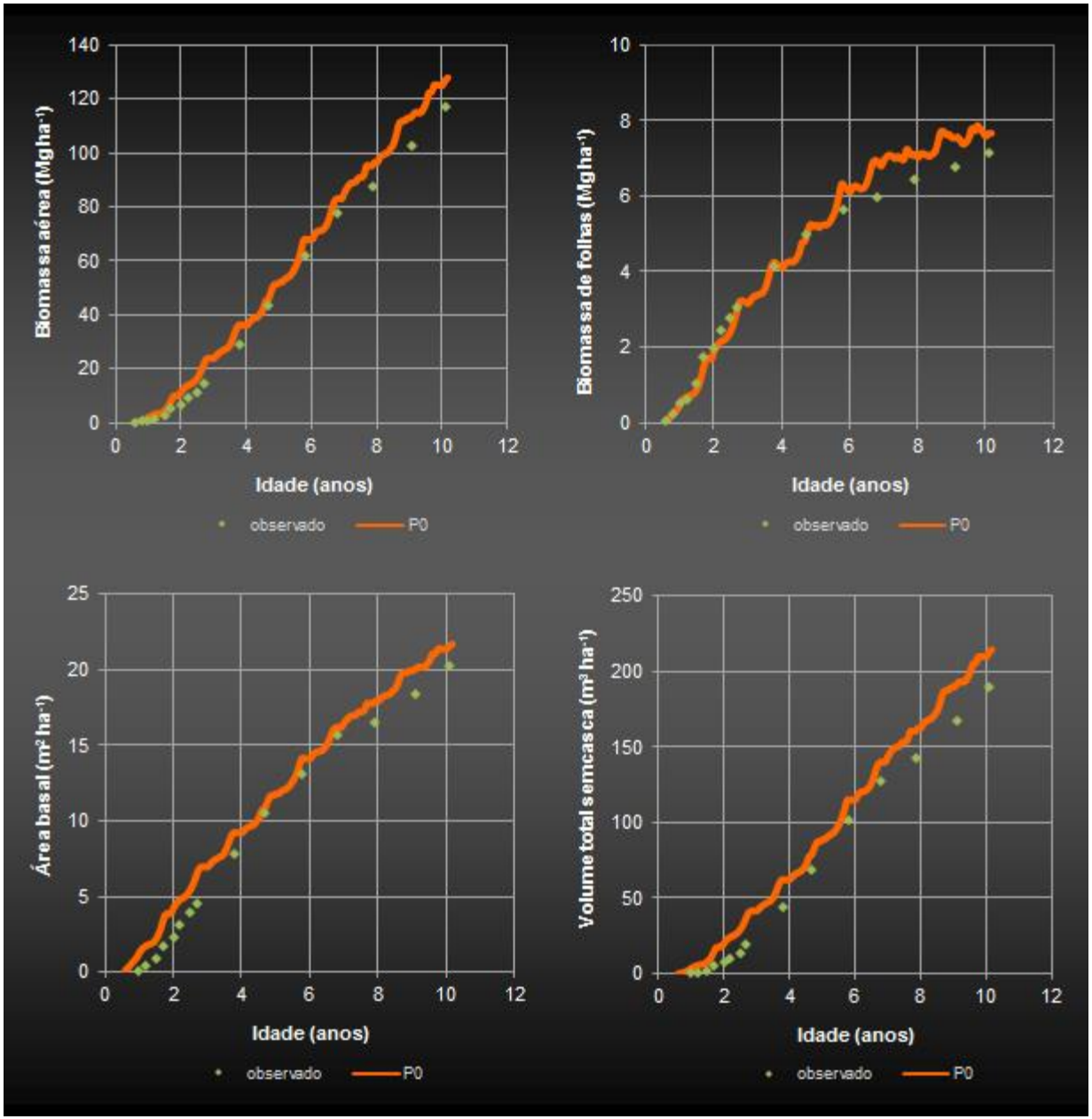
No defoliation

Jan Fev Mar Abr Mai Jun Jul Ago Set Out Nov Dez

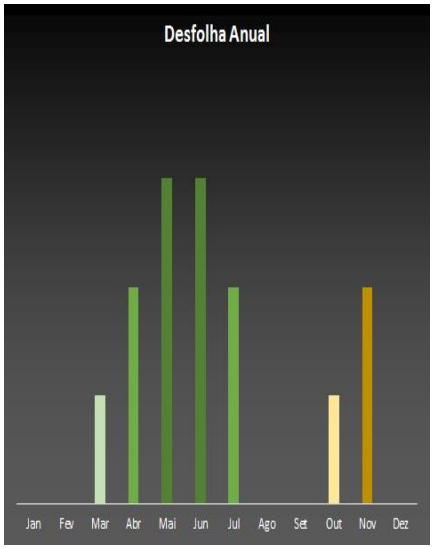
Scenario

0 %

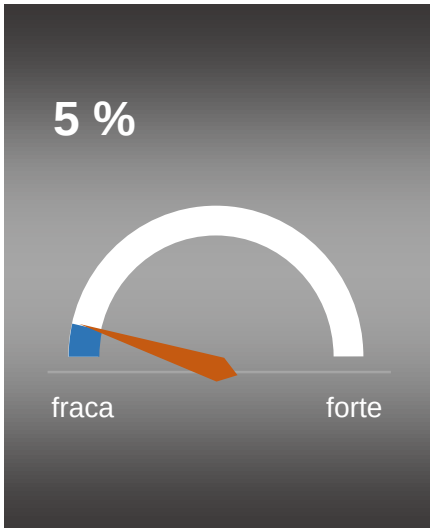
fraca forte

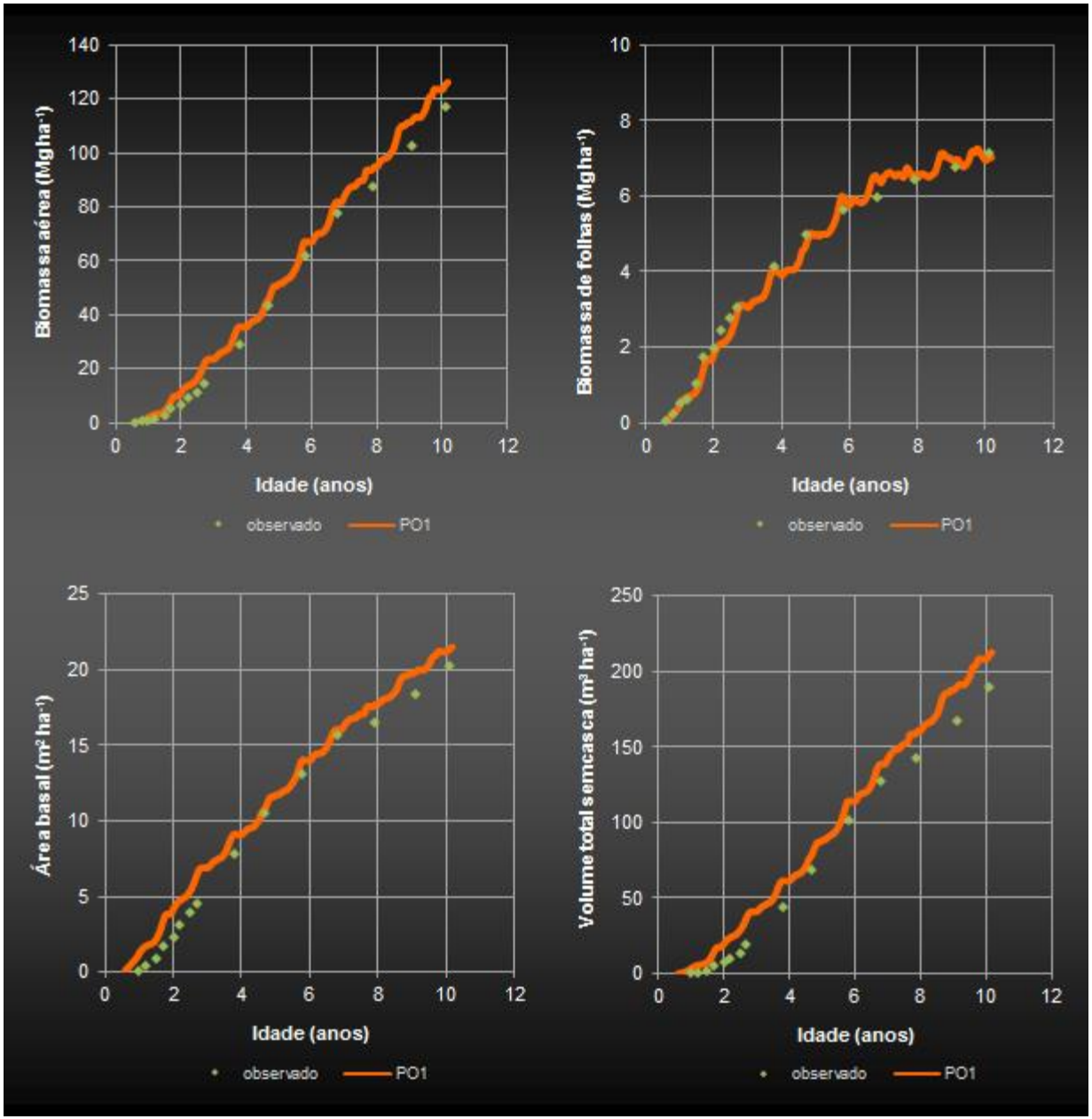


Defoliation scenarios 3-PG

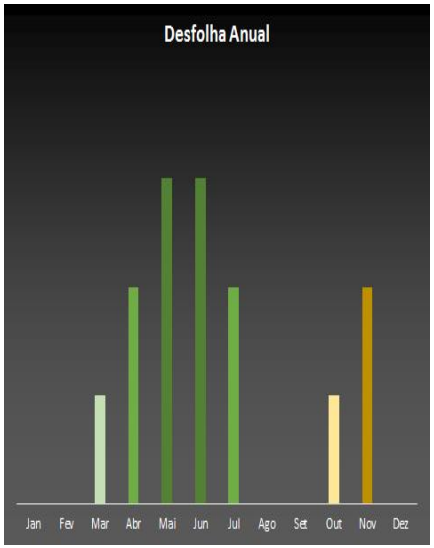


Scenario





Defoliation scenarios 3-PG



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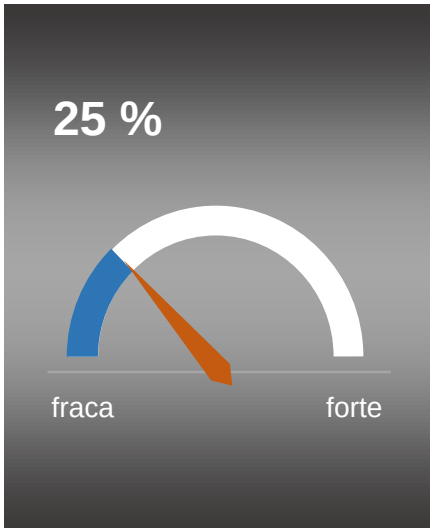
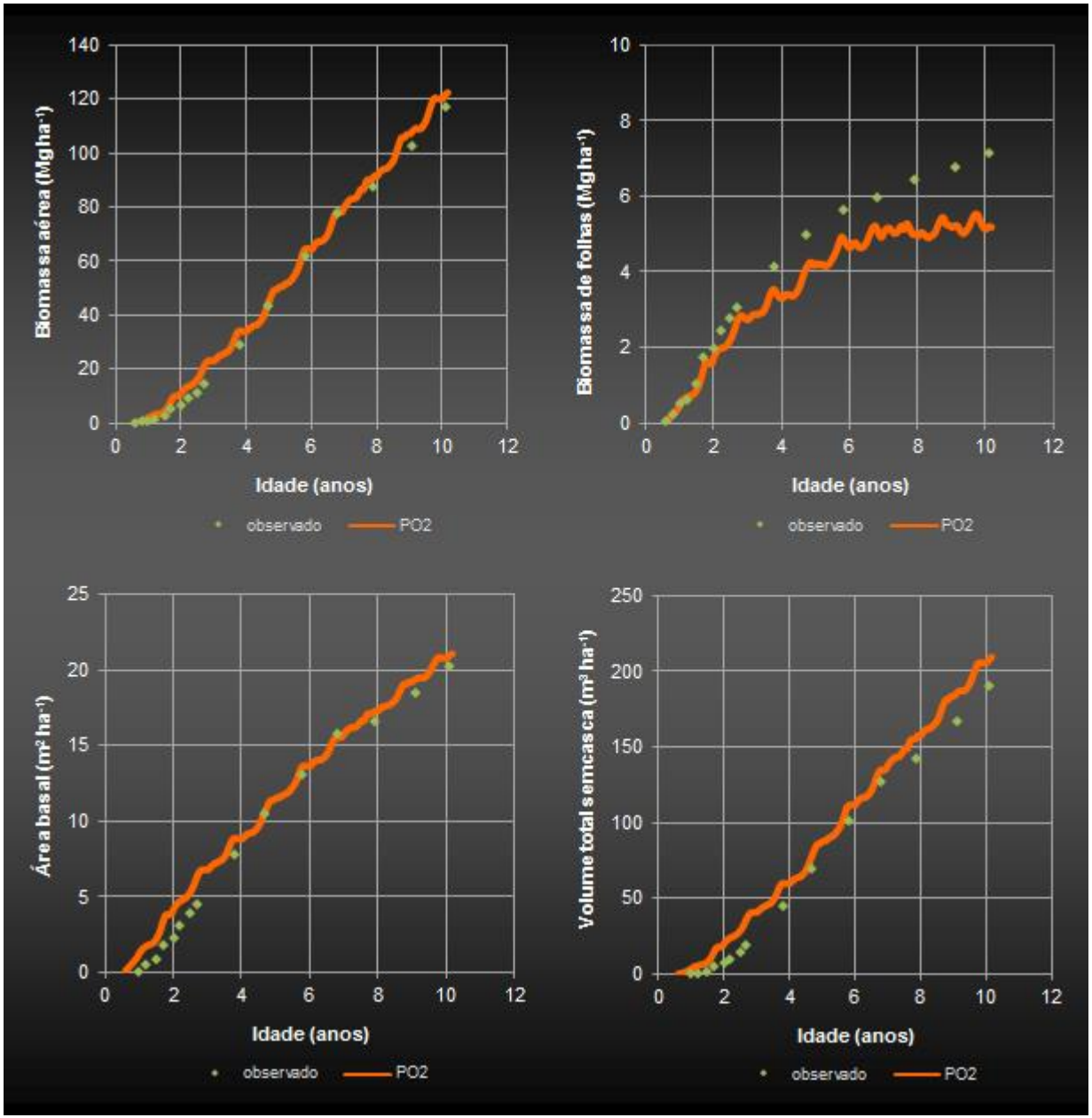
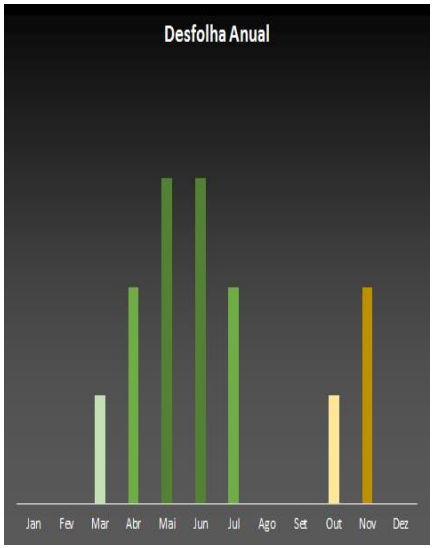




Defoliation scenarios 3-PG



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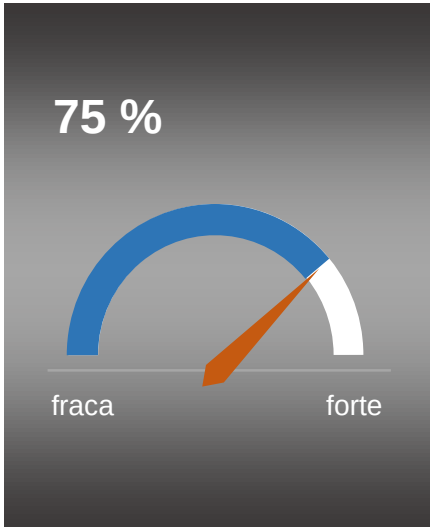
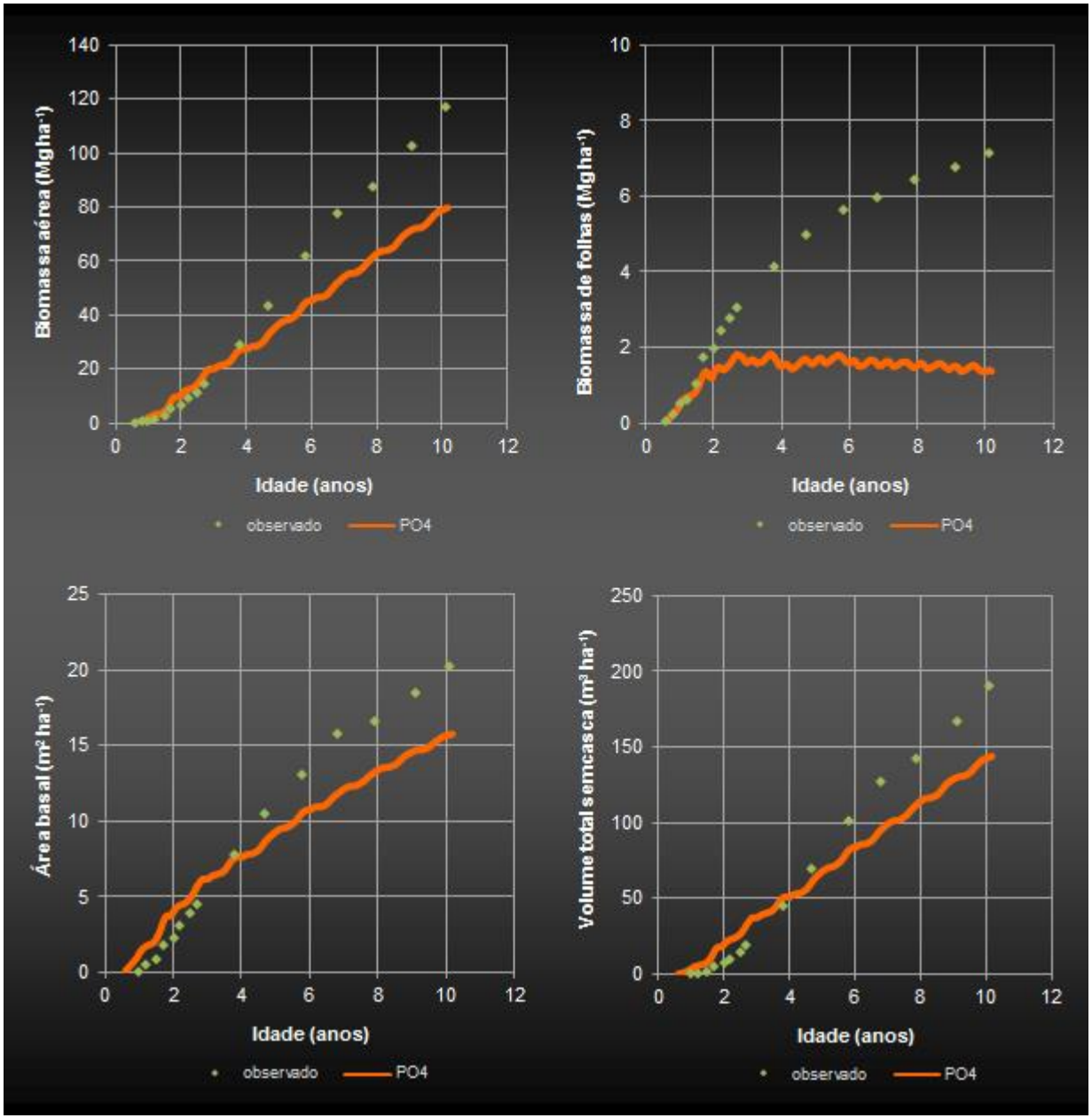
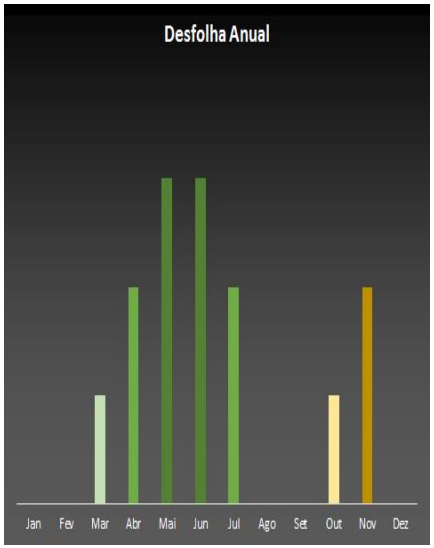
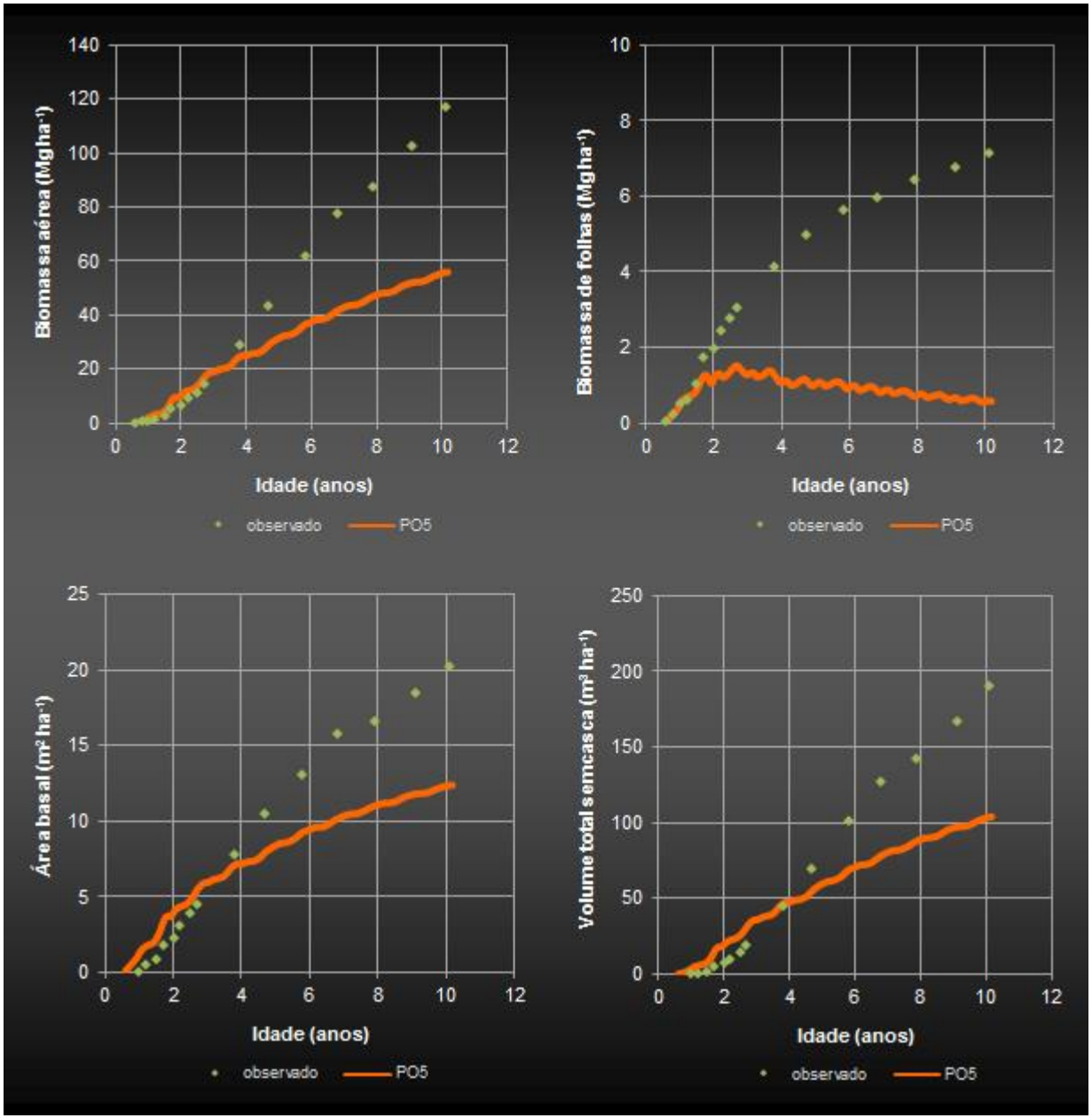




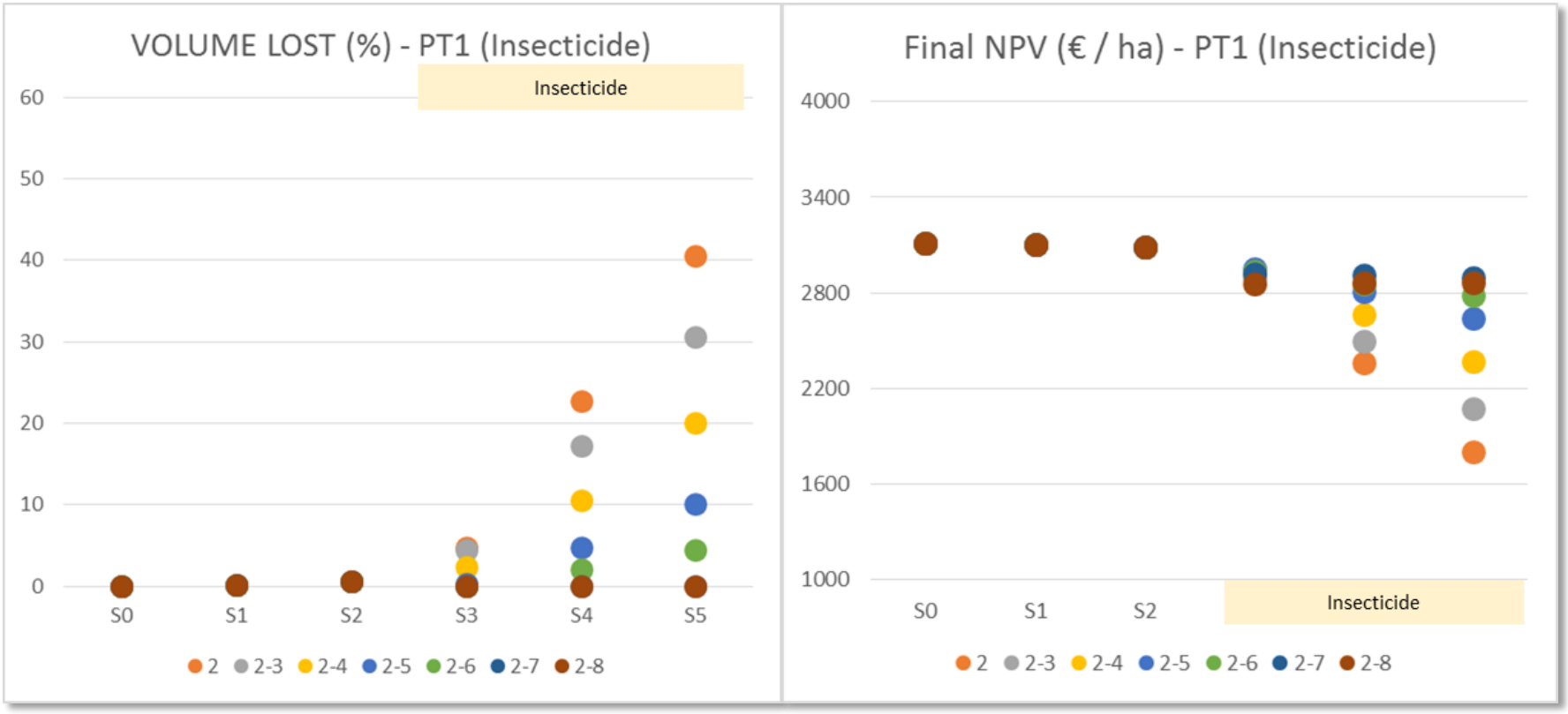
Defoliation scenarios 3-PG



Scenario



Different defoliation scenarios and treatments can be simulated and net cost-benefit estimated



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