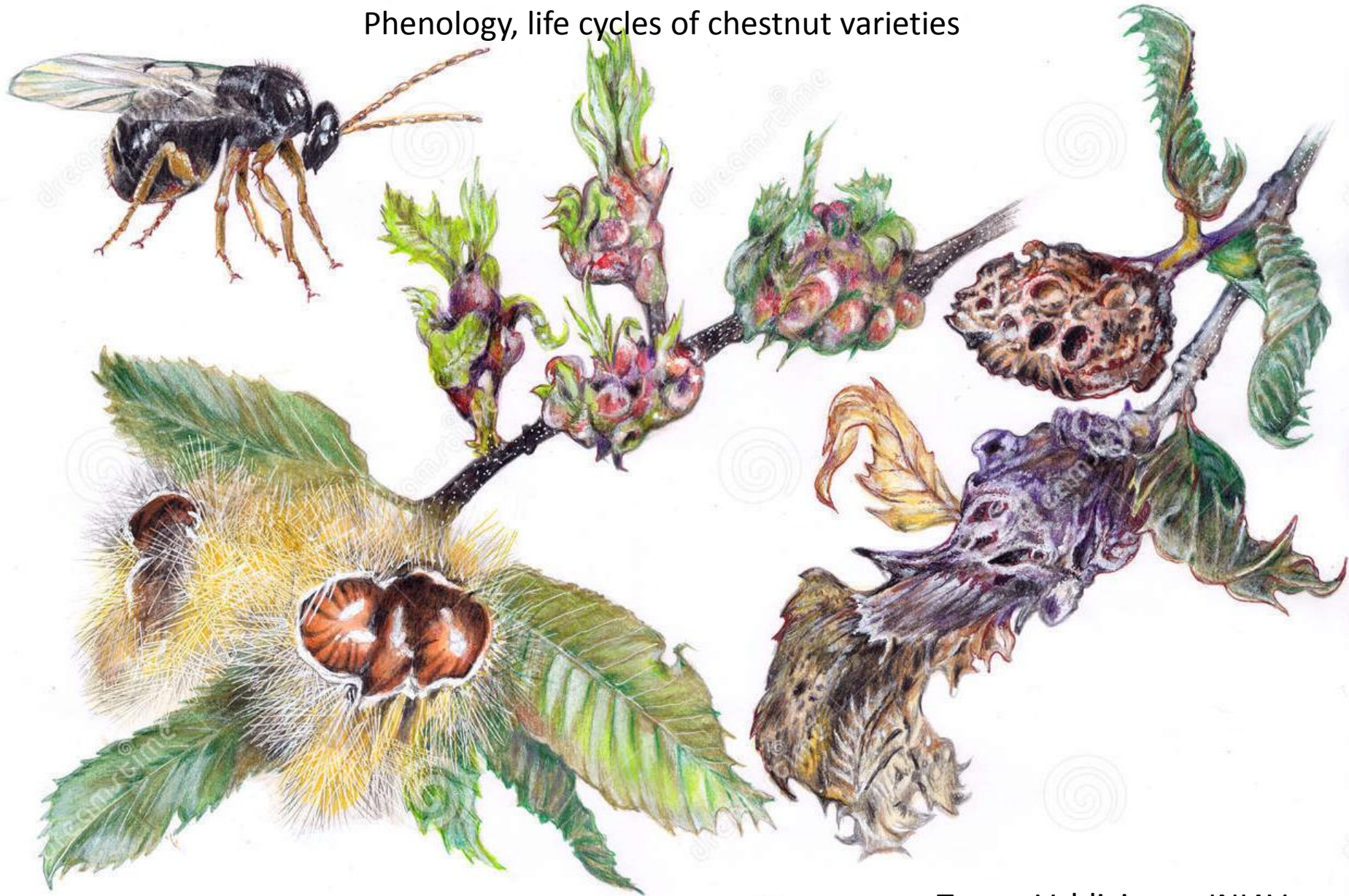


Fenologia das variedades de castanheiro

Phenology, life cycles of chestnut varieties



Teresa Valdivieso, INIAV

O que é a fenologia?

Fenologia é o estudo da resposta dos seres vivos e suas relações com os fatores ambientais

Essa resposta é avaliada em **fenofases**



Abrolhamento

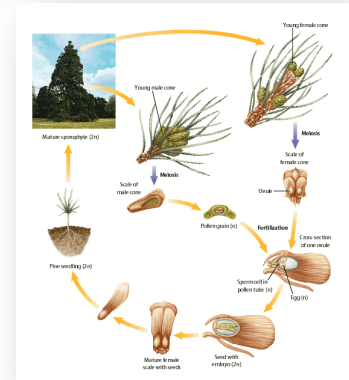
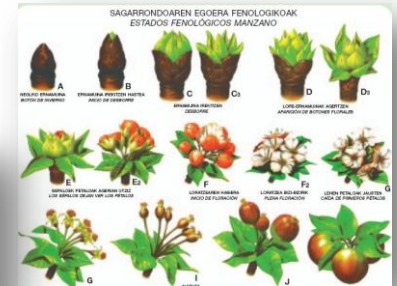
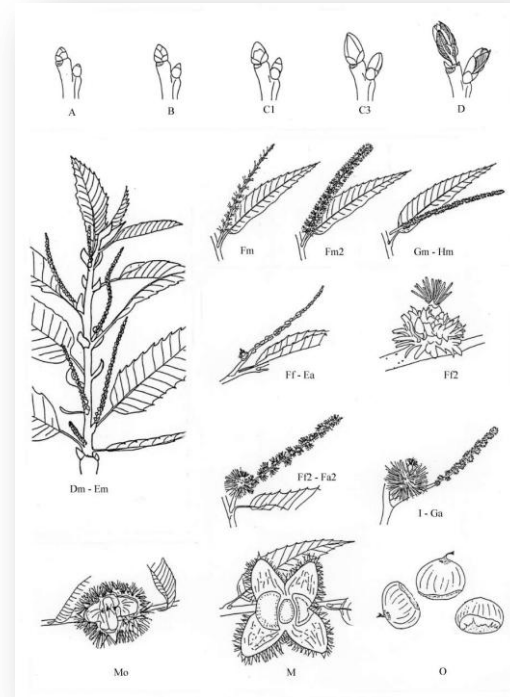
Floração

Frutificação

...

Estão dependentes:

- Características genéticas da planta
- Fatores ambientais
 - Precipitação
 - Temperatura
 - Outros fatores ambientais



O comportamento fenológico de uma planta resulta da interação das suas características genéticas e da influencia dos fatores ambientais

Fenologia do castanheiro

C₃



D



D



Dm



Em



Fm



F



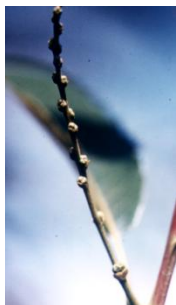
Fm₂



Estados Fenológicos das Cultivares

Data Colheita	Amarelal		Longal 5		Verdeal		Martainha 2	
	M	F	M	F	M	F	M	F
01 a 10/04	A	A	A	A	A	A	A	A
11 a 17/04	A	A	A	A	A	A	A	A
18 a 24/04	A-C ₁	A-C ₁	B	A	B	A	B-C ₁	B
25/04 a 03/05	C ₃	C ₃	C ₁	B	C ₁	C ₁	C ₃	C ₁
04 a 10/05	C ₃	D	C ₃	C ₁	C ₃	C ₃	D	C ₃
11 a 17/05	D	D	C ₃	C ₃	D	D	Dm	D
18 a 28/05	Dm	Ef	Dm	D	Em	D	Em	Da
29/5 a 04/06	Em	Ef	Em	Da	Em	Da-Ef	Em	Ef
05 a 14/06	Fm	Ff	Fm	Ef	Fm	Ef-Ff	Fm-Fm ₂	Ef-Ff
15 a 21/06	Fm	Ff-Ff ₂	Fm-Fm ₂	Ef-Ff	Fm-Fm ₂	Ff	Fm ₂	Ff-Ff ₂
22 a 28/06	Fm ₂	Ff ₂	Fm ₂	Ff ₂	Fm ₂	Ff ₂	Fm ₂	Ff ₂
29 a 01/07	Fm ₂	Ff ₂ -Ga	Fm ₂	Ff ₂	Fm ₂	Ff ₂	Gm	Ff ₂
02 a 12/07	Fm ₂ -Hm	Ga	Fm ₂	Ga	Gm	Ff ₂ -Ga	Hm	Ga-I
13 a 22/07		I	Gm-Hm	I	Hm	I		I

Datas (média de 5 anos, 1993/1997) dos estados fenológicos nas cultivares estudadas. **M** – flores masculinas, **F**.- Flores femininas. As letras de “A” a “I” representam os Estados Fenológicos, sendo o “C” o início do abrolhamento



Ef



Ef



Ff₂



Ff₂

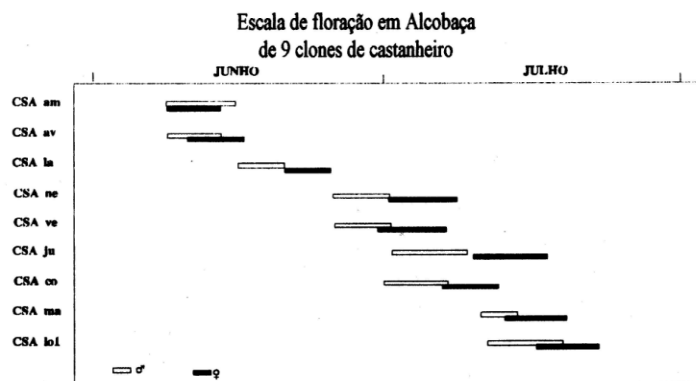
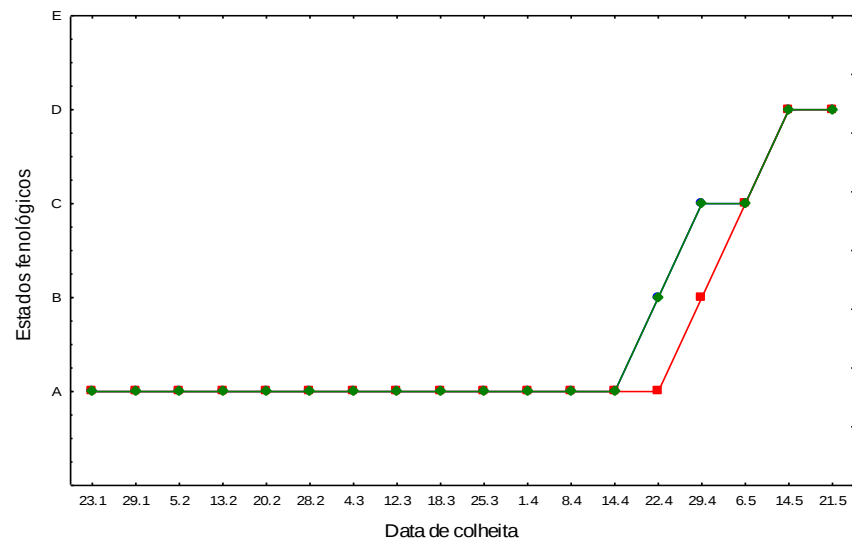


Ff₂



I

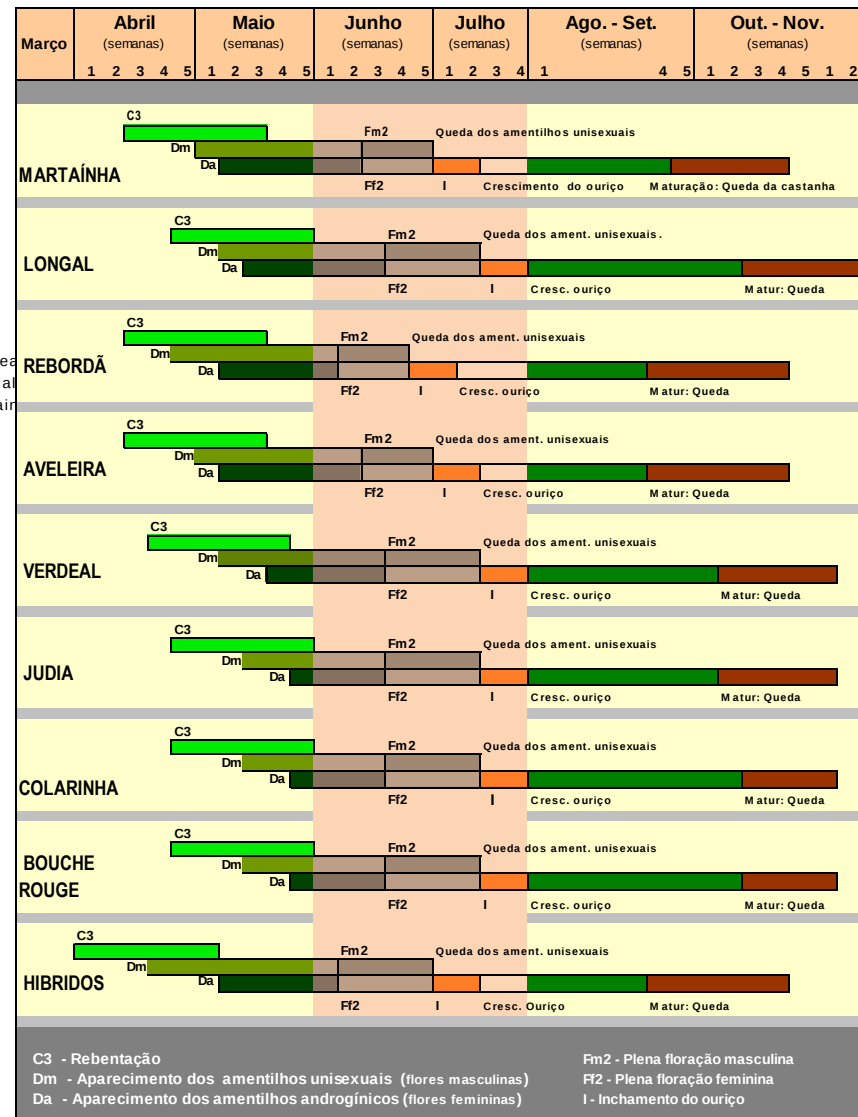
Fenologia do castanheiro – diferentes cultivares no mesmo local



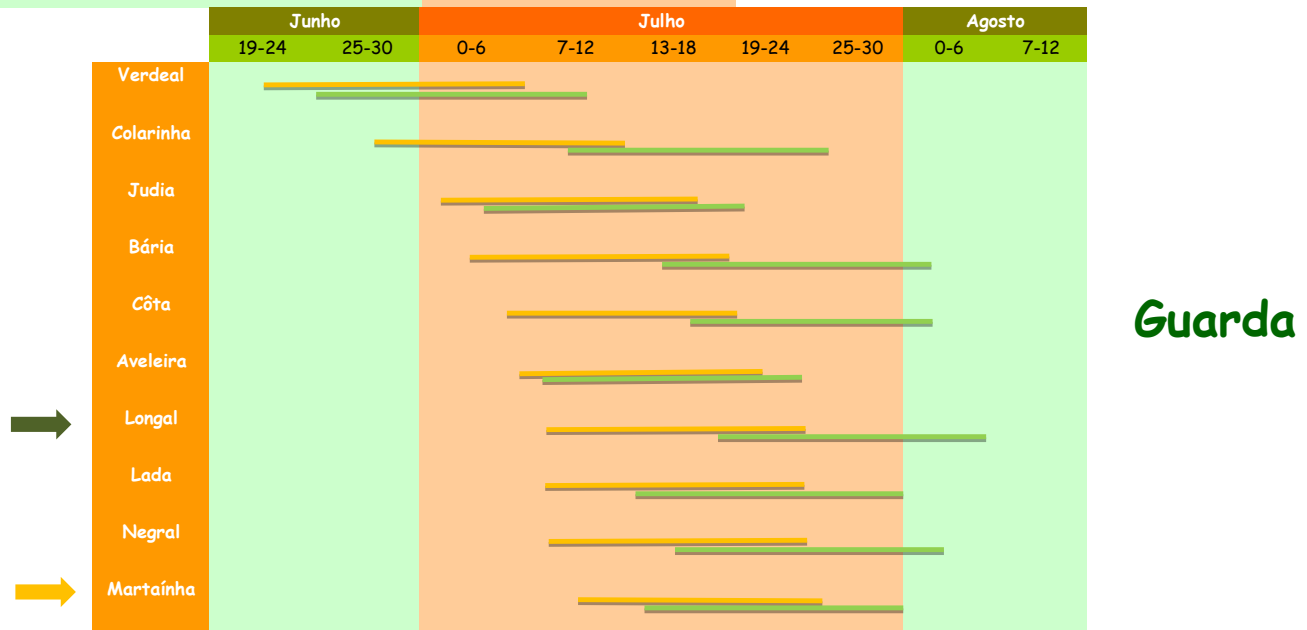
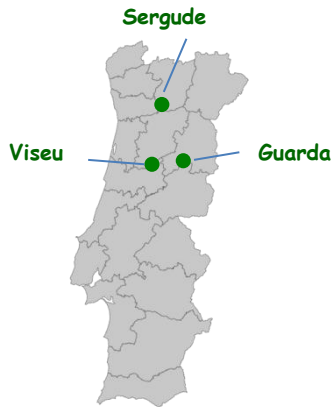
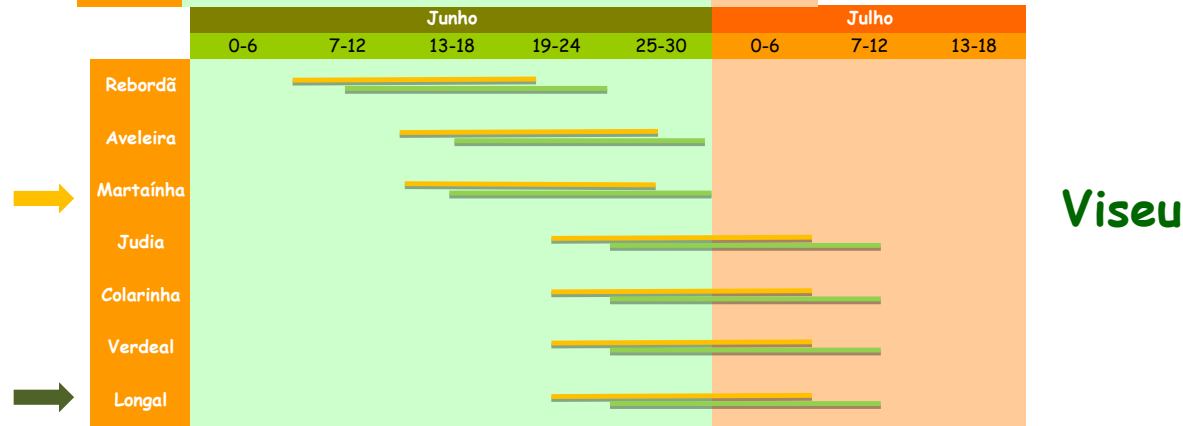
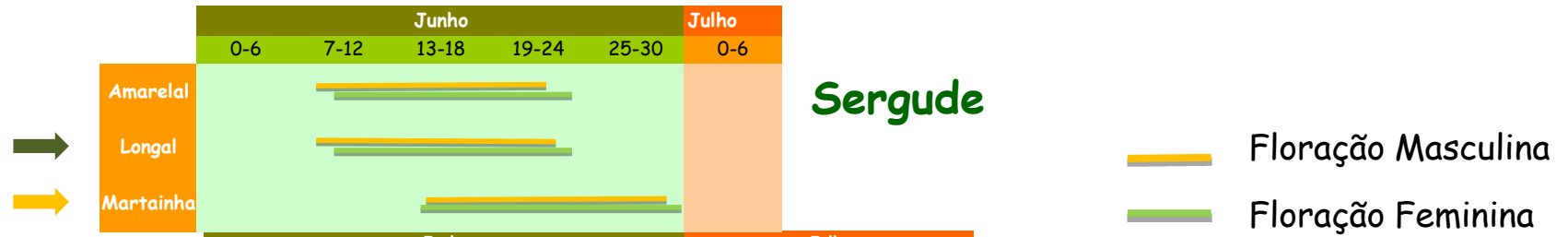
Alcobaça, 95-97



Viseu

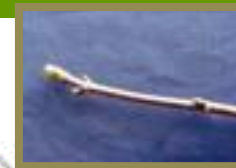
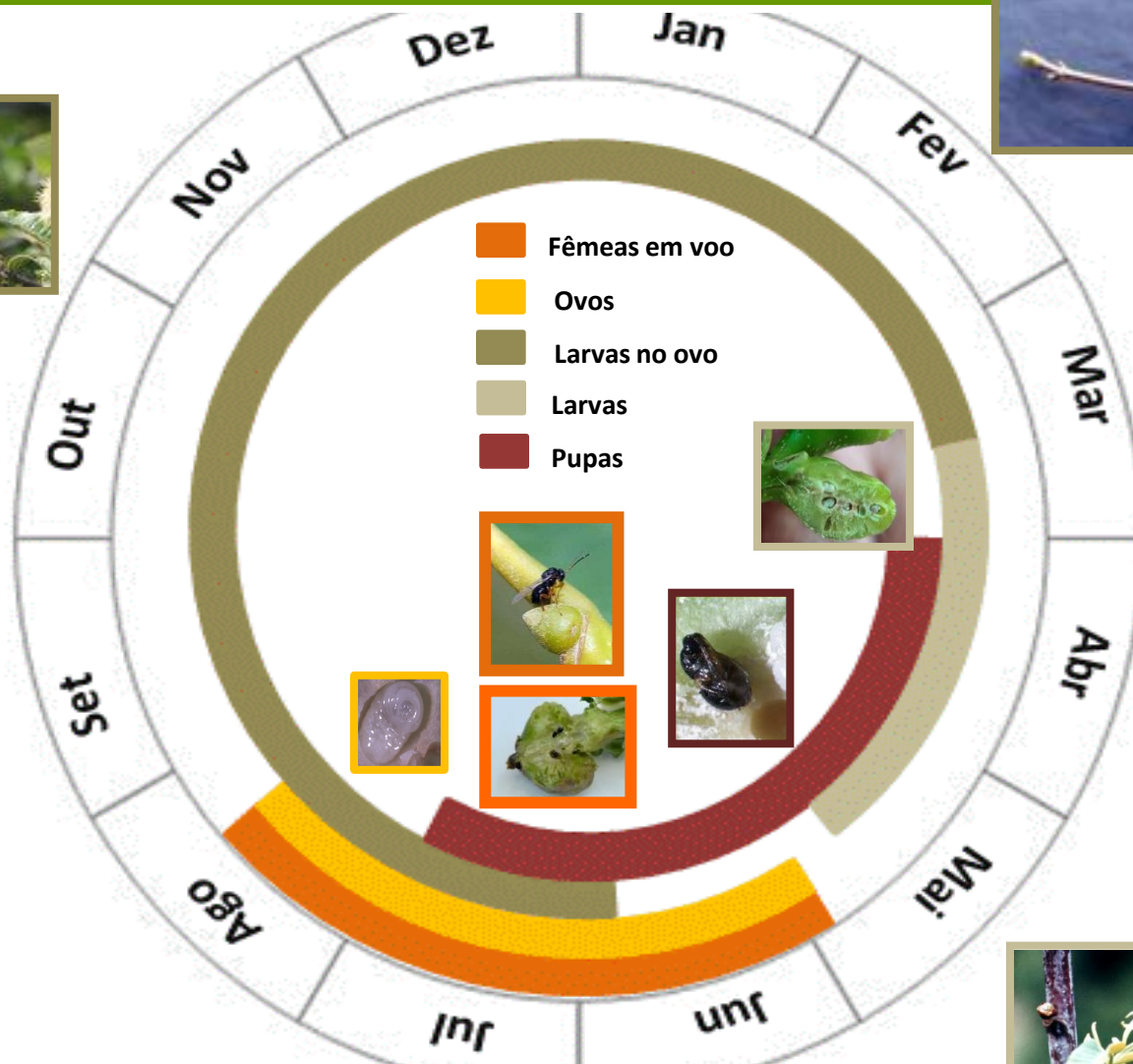


Fenologia do castanheiro - cultivares em diferentes locais

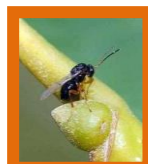
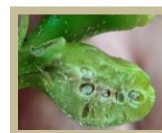


Fenologia do castanheiro - ciclo biológico do *Dryocosmus*

I



A



C₃



D

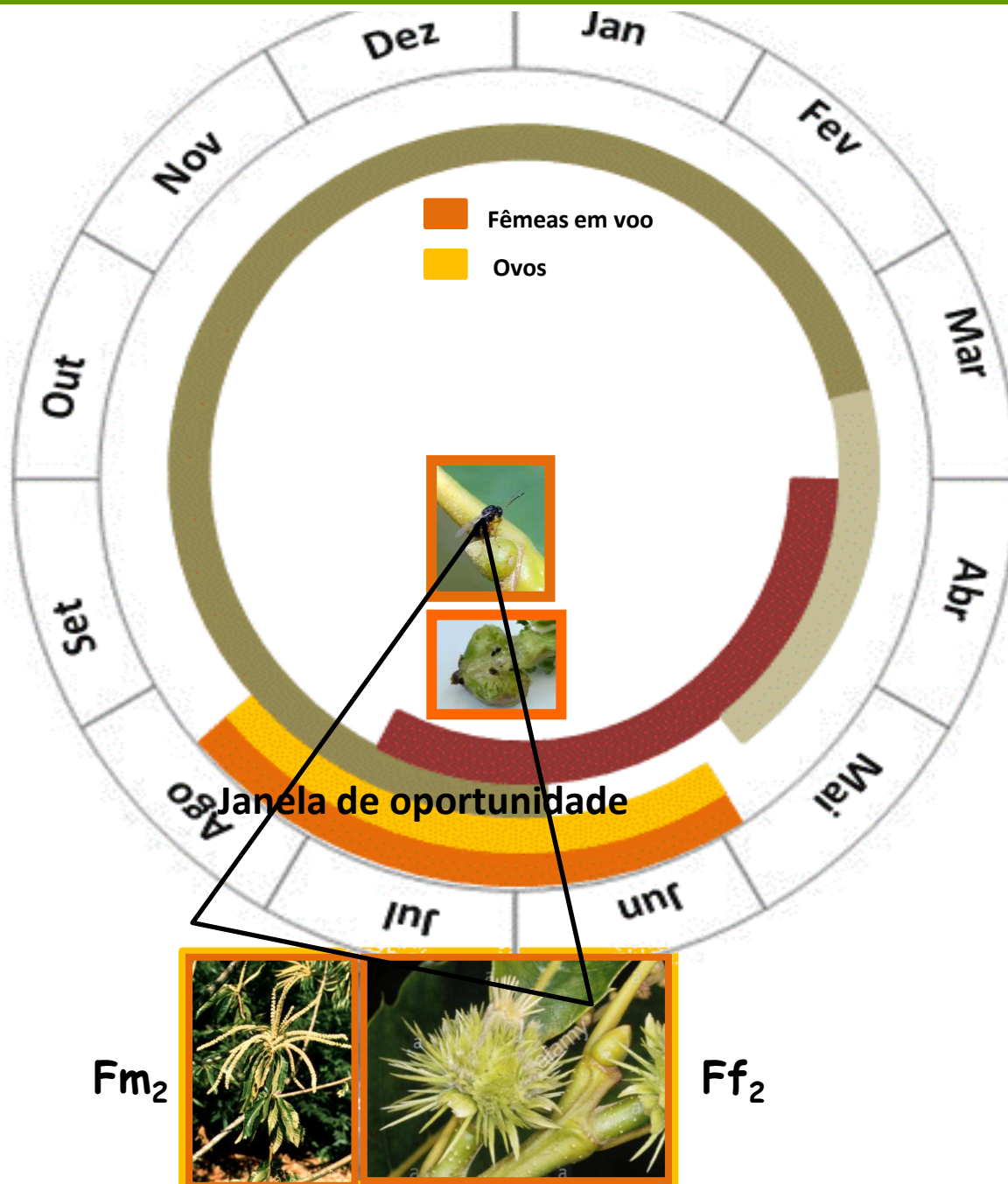


Fm₂

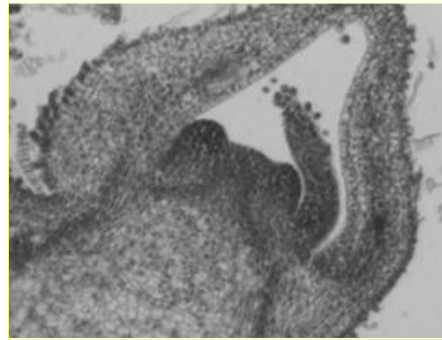


Ff₂

Fenologia do castanheiro - ciclo biológico do *Dryocosmus*



Postura do *Dryocosmus* em gomos vegetativos



Gomo vegetativo são

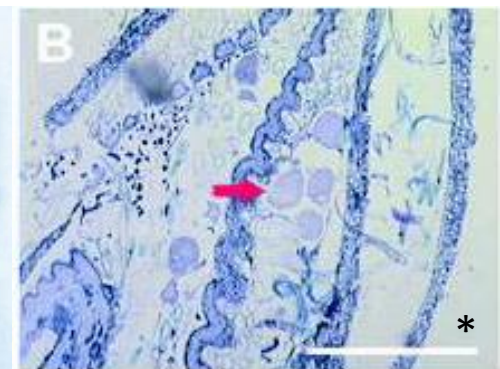
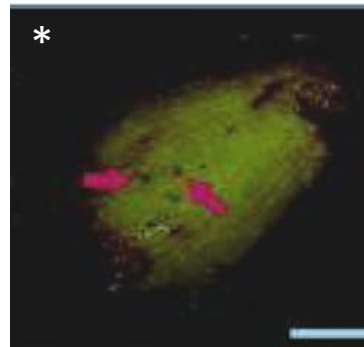
Fase de interseção entre o ciclo fenológico do castanheiro e o ciclo biológico do *Dryocosmus*



Foto: Giovanni Bosio

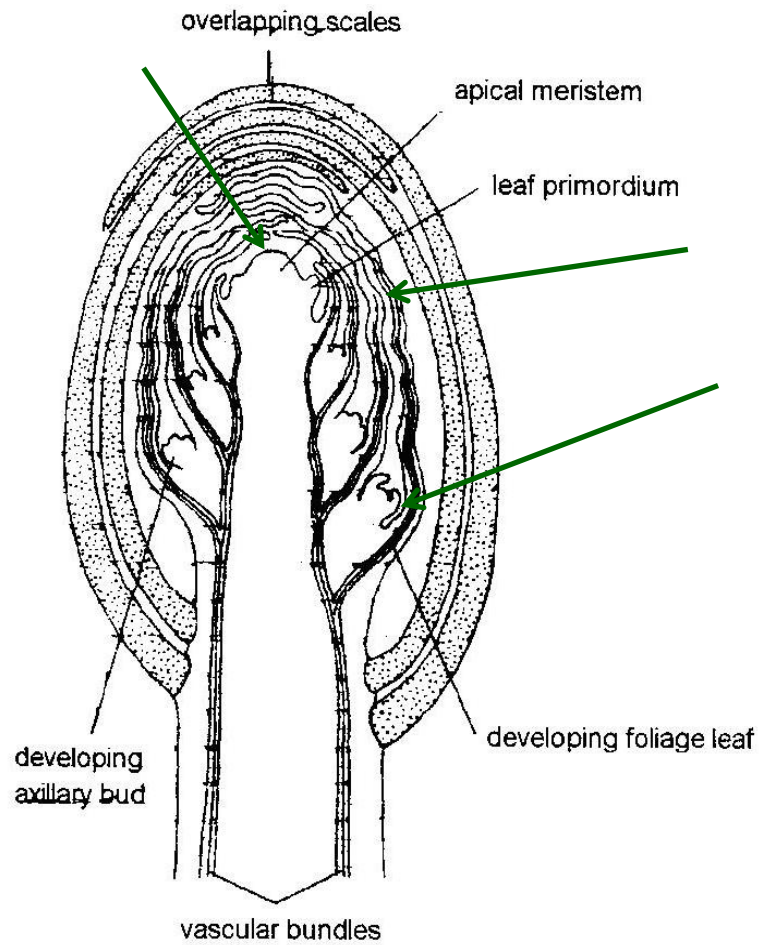
As fêmeas durante junho e julho fazem várias posturas no interior dos gomos foliares das plantas

* Reale L, Tedeschini E, Rondoni G, Ricci C, Bin F, Frenguelli G, Ferranti F (2014). Histological investigation on gall development induced by a worldwide invasive pest, *Dryocosmus kuriphilus*, on *Castanea sativa*. Plant Biosystems 150: 35-42.



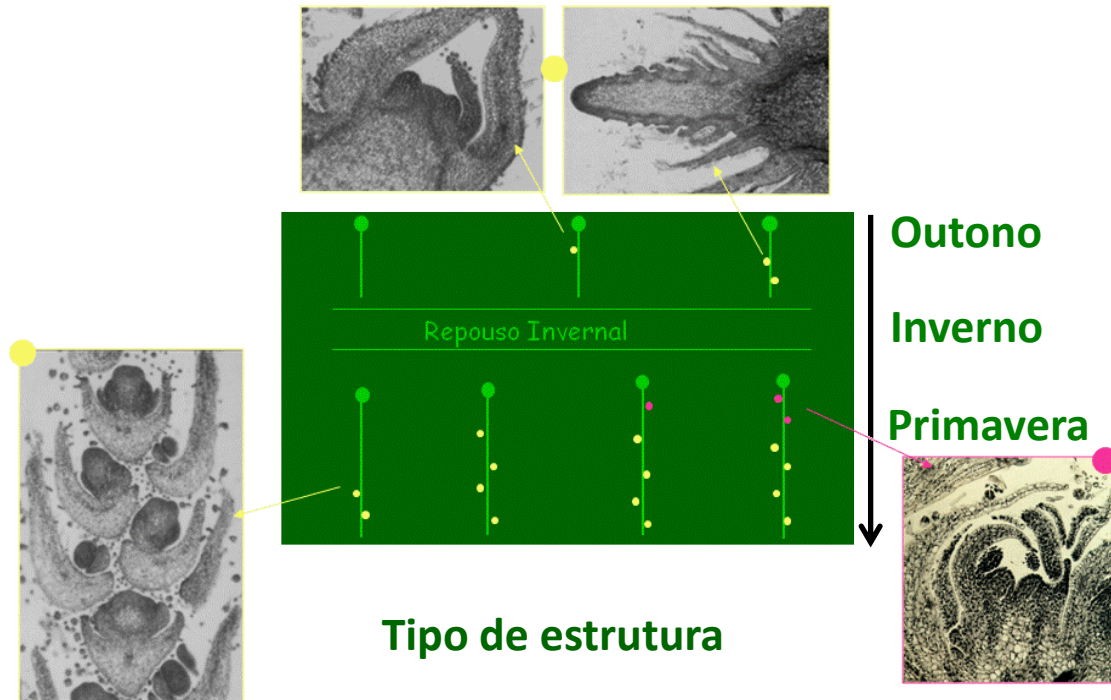
Gomos vegetativos

Verão



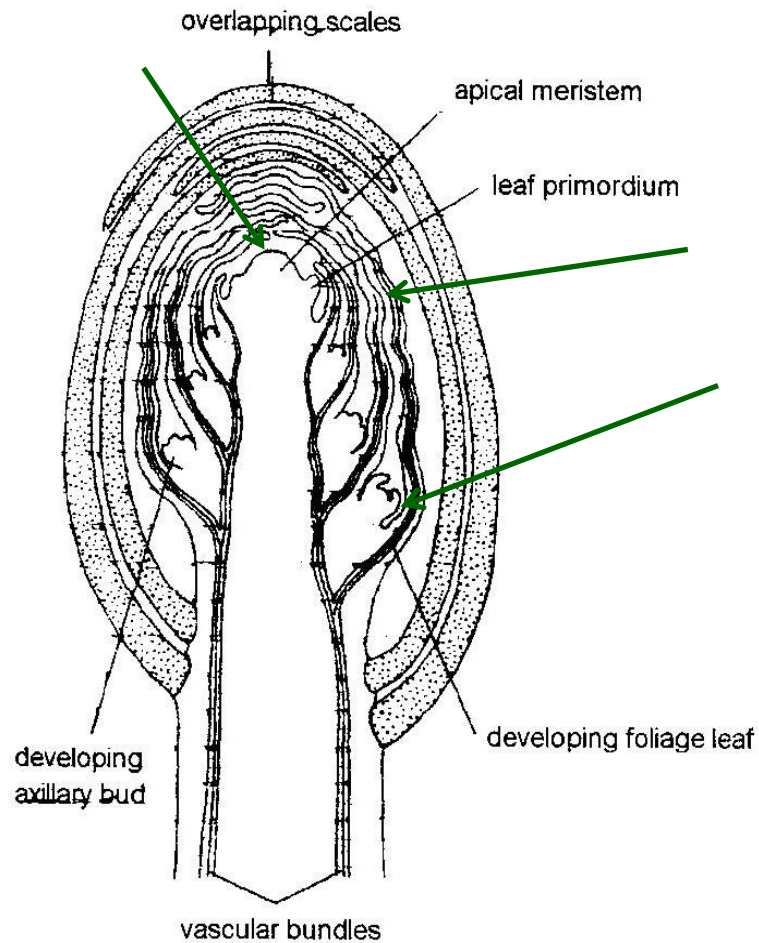
Local de postura

Diferenciação floral

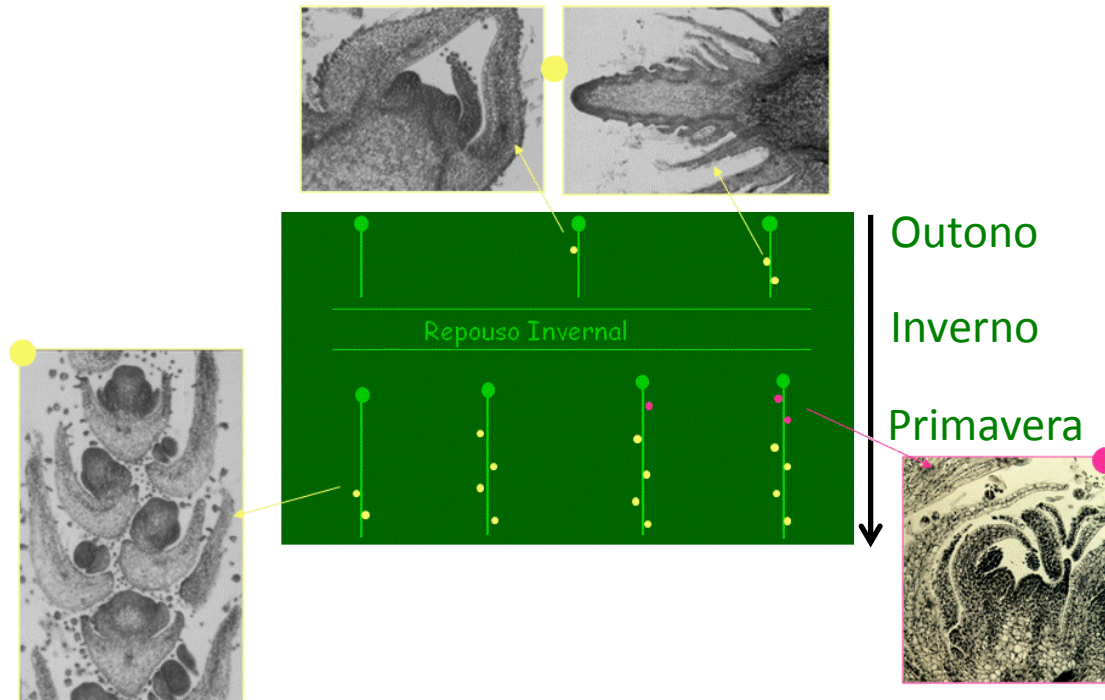


Gomos vegetativos

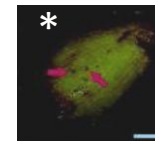
Verão



Diferenciação floral

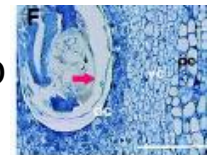


Fases de formação das galhas



1 iniciação,

2 desenvolvimento



3 maturação



* Reale L, Tedeschini E, Rondoni G, Ricci C, Bin F, Frenguelli G, Ferranti F (2014). Histological investigation on gall development induced by a worldwide invasive pest, *Dryocosmus kuriphilus*, on *Castanea sativa*. Plant Biosystems 150: 35-42.

Tipos de galhas

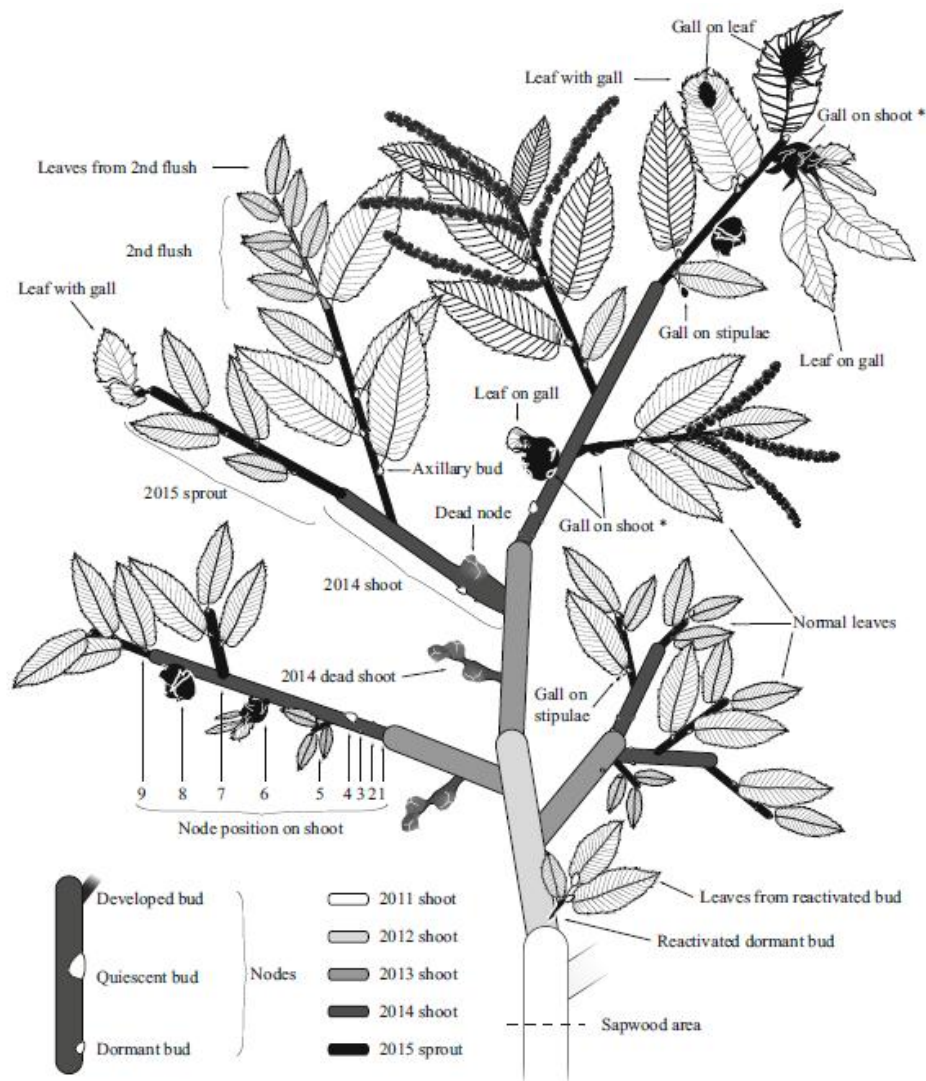


Fig. 2 Schematic structure of a chestnut branch with gall wasp attacks. Please refer to Table 2 for detailed definitions of branch features. *Based on our definition, these types of galls should be

referred to as "galls on sprouts". However, we use "galls on shoots" to be consistent with existing literature



a. Gall at the base of leaf



b. Gall at the base of the shoot



c. Gall on the leaf



d. Gall at the inflorescence base



e. Gall on the whole bud

Gehring E, Bellosi B, Quacchia A, Conedera M. 2017. Assessing the impact of *Dryocosmus kuriphilus* on the chestnut tree: branch architecture matters. J Pest Sci. <https://doi.org/10.1007/s10340-017-0857-9>

Sartor, C., Dini, F., Torello-Marionni, D., Mellano, M.G., Beccaro, G.L., Alma, A., Quacchia, A., Botta, R., 2015. Impact of the Asian wasp *Dryocosmus kuriphilus* (Yasumatsu) on cultivated chestnut: yield loss and cultivar susceptibility. Sci. Hortic. 197, 454-460.

Diferenças fenológicas

Junho-Julho

- Floração, alongamento do eixo,
- **novos gomos**

Diferenças fenológicas

Junho-Julho

Híbridos

- Novos gomos



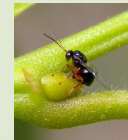
Variedades portuguesas

- Novos gomos



Variedades francesas

- Novos gomos



Diferenças fenológicas /resistência genética

Muito
precoces

Gomo demasiado
atempado

Muito
tardias

Falta de
sincronismo com
o ciclo biológico

