

Susceptibilidade de variedades de castanheiro a *Dryocosmus kuriphilus*



PLURIFOR WP2 – CHESTNUT GALL WASP RISK

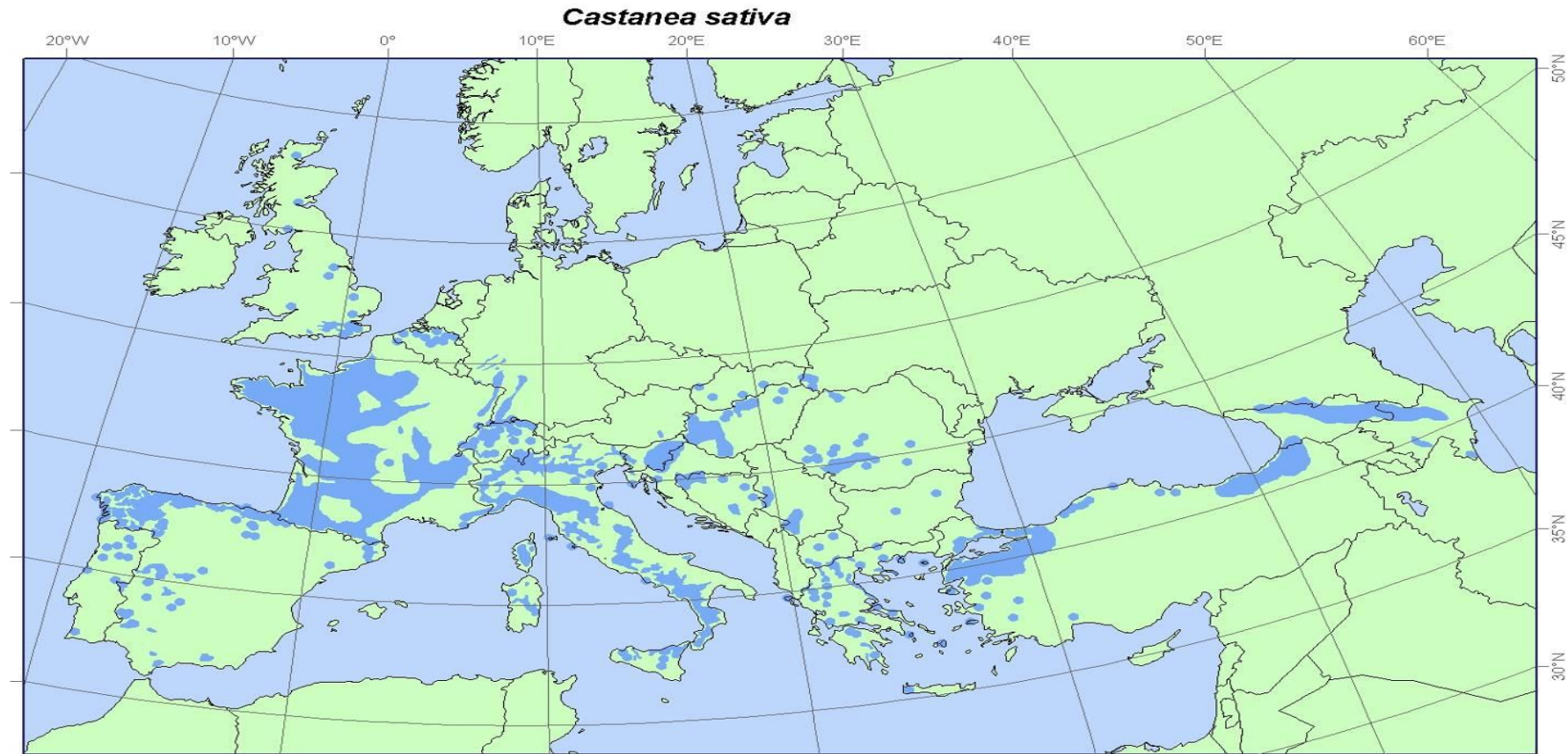
**19th October 2017
Vila Real, Portugal**

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Mapa de distribuição de *Castanea sativa* na Europa



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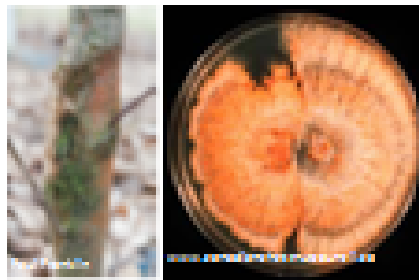
The distribution map, including both natural and naturalized occurrence of *Castanea sativa*, was compiled by members of the EUFORGEN Networks based on an earlier map published by (i) Maurer, W.D.; Fernández-López, J. in 2001 (Establishing an international sweet chestnut (*Castanea sativa* Mill.) provenance test: preliminary steps Forest Snow and Landscape Research. 76, 3: 482-486) and by (ii) Bounous G. in 2002 (Il Castagno: coltura, ambiente ed utilizzazione in Italia e nel mondo. Ed. Agricole – Bologna, Italy) and was published in: Fernández-López J. and R. Alía. 2003. EUFORGEN Technical Guidelines for genetic conservation and use for chestnut (*Castanea sativa*). International Plant Genetic Resources Institute, Rome, Italy. 6 pages.

First published online in 2003 - Updated on 30 July 2008

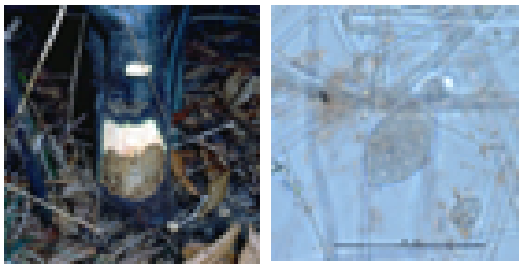
0 250 500 1,000 Km

Castanea sativa main threats – diseases and pests

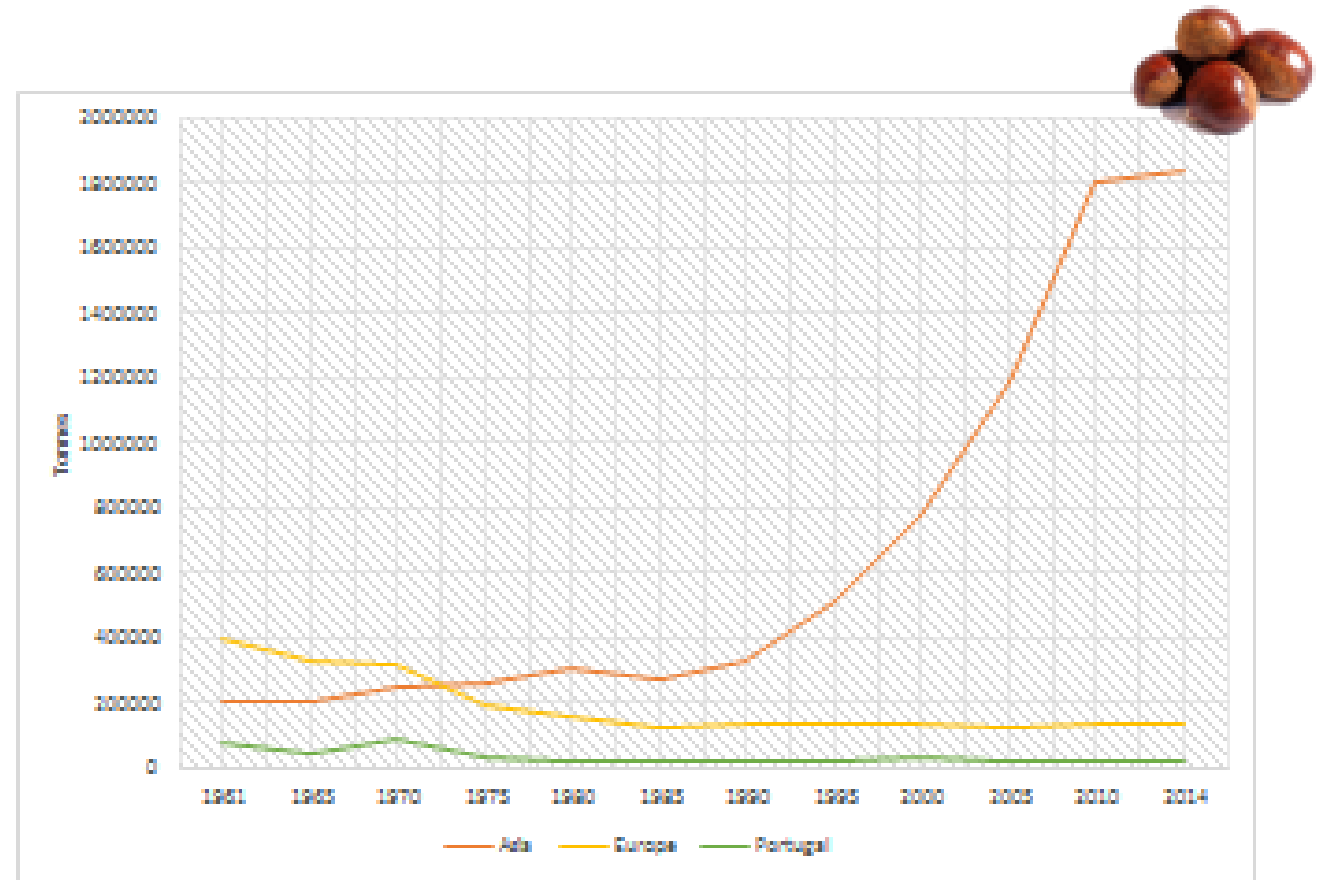
→ CHESTNUT BLIGHT – *Cryphonectria parasitica*



→ INK DISEASE – *Phytophthora cinnamomi*



→ GALL WASP – *Dryocosmus kuriphilus*



FAOSTAT, 2017



O castanheiro tem dois regimes de exploração: fruto e madeira

As três principais variedades Portuguesas : Longal, Judia e Martainha

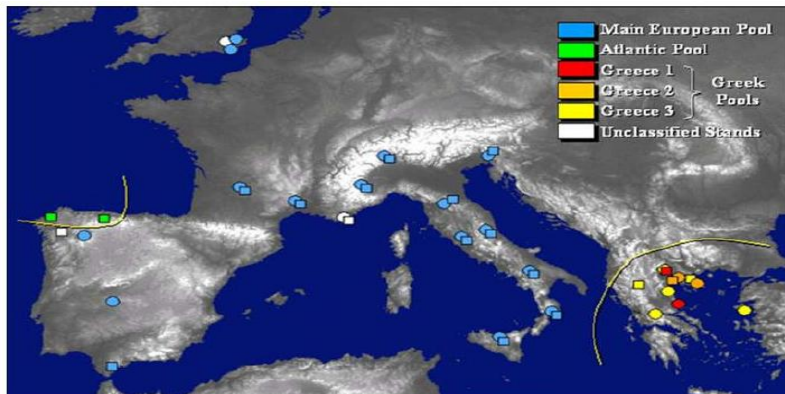


Alto Fuste

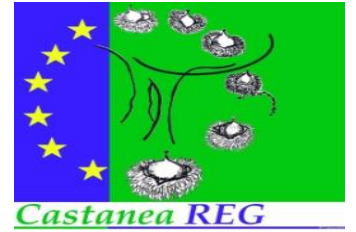


Diversidade genética das populações de *Castanea sativa*

Mattioni *et al.*, 2008



5 distinct gene pools of chestnut in Europe

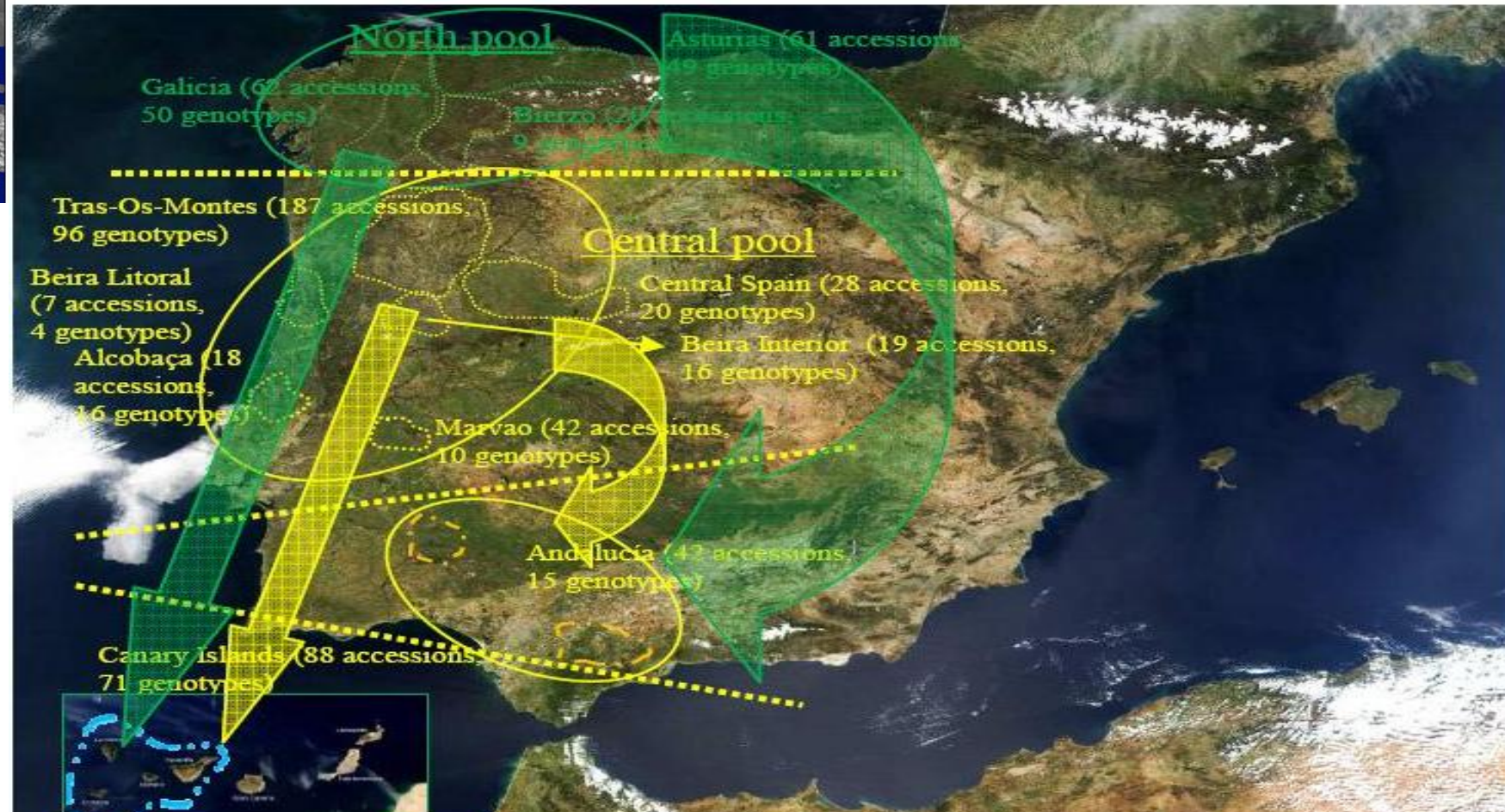


Pereira-Lorenzo, Costa et al, 2010
Tree Genetics and Genomes

Duas principais origens:

Norte da Península Ibérica (Astúrias e Galiza) e Zona Central (Trás-os-Montes e Centro de Espanha)

10 Microssatélites nucleares
574 amostras de *C.sativa* de variedades da P.bérica/ 292 de Portugal; 71 híbridos; 47 *C.crenata*;
37 *C. mollissima*; 33 *C.henryi*



Número de amostras, genótipos e clonalidade/ região para 10 loci

Region	Country	No. of accessions	No. of genotypes	Clonality, 100 – genotypes × 100 /accessions	
Northern Iberian Peninsula					Diversidade elevada devida a: - enxertia - hibridação - mutação
Asturias	Spain	61 (97)	49	20 (49)	
Galicia	Spain	62 (130)	50	19 (62)	
Castilla-León (El Bierzo)	Spain	20	9	55	
Northern mean			36	31	
Central Iberian Peninsula					Longal é a principal variedade com 107 acessos
Trás-os-Montes	Portugal	187	96	49	
Beira Interior	Portugal	19	16	16	
Beira Litoral	Portugal	7	4	43	
Alcobaça	Portugal	18	16	11	
Marvão	Portugal	42	10	76	
Ávila, Cáceres, Salamanca	Spain	28	20	29	
Central mean			27	37	
Southern Iberian Peninsula					
Andalucía	Spain	42	15	64	
Canary Islands					
Tenerife	Spain	40	28	30	
La Palma	Spain	33	30	9	
Gomera-Hierro	Spain	15	13	13	
Canary Islands mean			24	17	
Azores Islands					
Terceira		19	0*	100	
Mean				33 (39)	
Total		593	356		



Castanea REC



356 genótipos diferentes/593 amostras analisadas, clonalidade média de 33% devida a enxertia

Table 5. Number of accessions and different genotypes related by clonality, hybridization, and mutation rate in the 10 reconstructed populations (RPPs) defined by a model-based Bayesian procedure, implemented in the program Structure (Pritchard et al. 2000).

RPP	Cultivar group	Total accessions	Total genotypes	Clonality, 100 – genotypes × 100/accessions	Genotypes related by mutation	Genotypes related by hybridization	Genotypes related by hybridization or mutation	No. of denominations involved
1	'Chamberga' (No.)	25(69)	20		2	18	0	16 (Spain)
1	'Chamberga' (%)			20(71)	8(3)	72(26)	0	
2	'Paredé' (No.)	18(49)	6		1	5	0	11 (Spain)
2	'Paredé' (%)			67(88)	6(2)	28(10)	0	
3	'Inxerta'–'Lamela' (No.)	14(27)	13		0	10	3	10 (9 Spain, 1 Portugal)
3	'Inxerta'–'Lamela' (%)			7(52)	0	71(37)	21(11)	
4	'Famosa' (No.)	33(59)	26		0	26	0	26 (25 Spain, 1 Portugal)
4	'Famosa' (%)			21(56)	0	79(44)	0	
→ 5	'Longal' (No.)	103(107)	48		8	34	6	19 (10 Portugal, 8 Spain, 1 both)
5	'Longal' (%)			53(55)	7	33(32)	6	
→ 6	'Verdeal'–'Martainha'–'Rebordá' (No.)	31	8		4	2	2	4 (Portugal)
6	'Verdeal'–'Martainha'–'Rebordá' (%)			74	13	6	6	
→ 7	'Lada' (No.)	23(33)	13		3	9	1	8 (7 Portugal, 1 Spain)
7	'Lada' (%)			43(61)	13(9)	39(27)	4(3)	
→ 8	'Aveleira' (No.)	47	19		1	14	4	9 (8 Portugal, 1 Spain)
8	'Aveleira' (%)			60	2	30	9	
→ 9	'Bária'–'Judía' (No.)	34	10		3	7	0	5 (Portugal)
9	'Bária'–'Judía' (%)			71	9	21	0	
→ 10	'Amarelal'–'Dieguina' (No.)	47	13		2	11	0	11 (7 Portugal, 4 Spain)
10	'Amarelal'–'Dieguina' (%)			72	4	23	0	
	Total (No.)	375(503)	176*		24	136	16	86 (26 Portugal, 59 Spain, 1 both) *
	Total			53(65)	6(5)	36(27)	4(3)	

Note: In parentheses we have included those repetitive accessions previously removed (Pereira-Lorenzo et al. 2006).

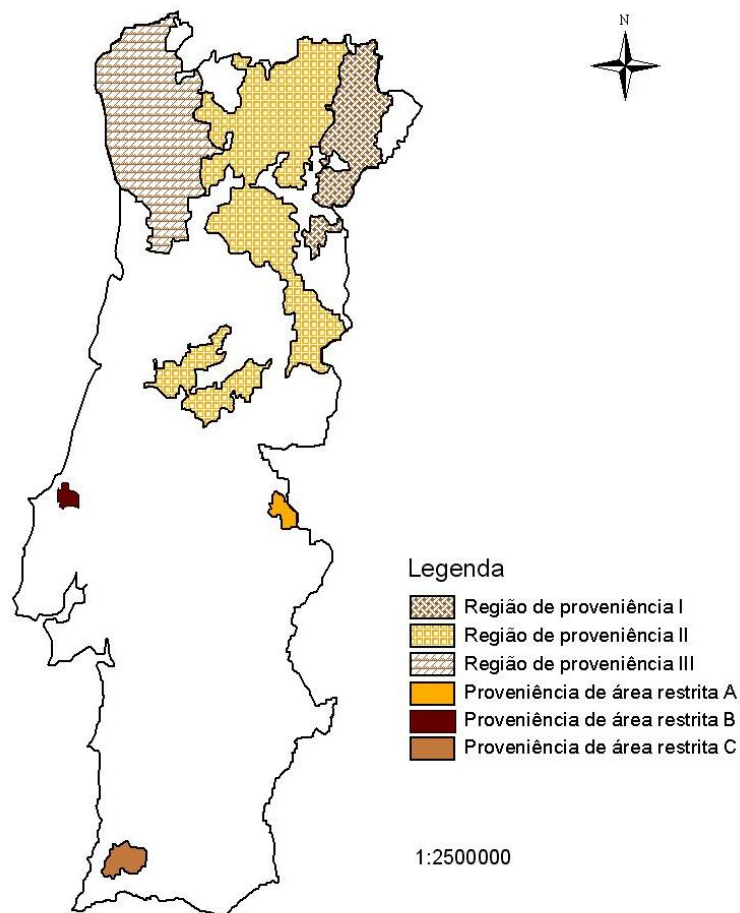
*Repetitions between RPPs were excluded.

356 genótipos diferentes/ **593** acessos analisados, com uma média de **clonalidade** de **33%** devida a **enxertia**. As **mutações** contribuíram com **6%** para **variabilidade**, explicando a **hibridação** **61%** da variabilidade



Regiões e Proveniência e Proveniências de Áreas Restritas

Fonte: adaptado de DGRF, 2003



● Em 2003, a DGRF delimita, pela 1ª vez, as Regiões de Proveniência de Castanheiro e Proveniências de Áreas Restritas

● Objectivo, proteger e garantir o património genético da espécie.

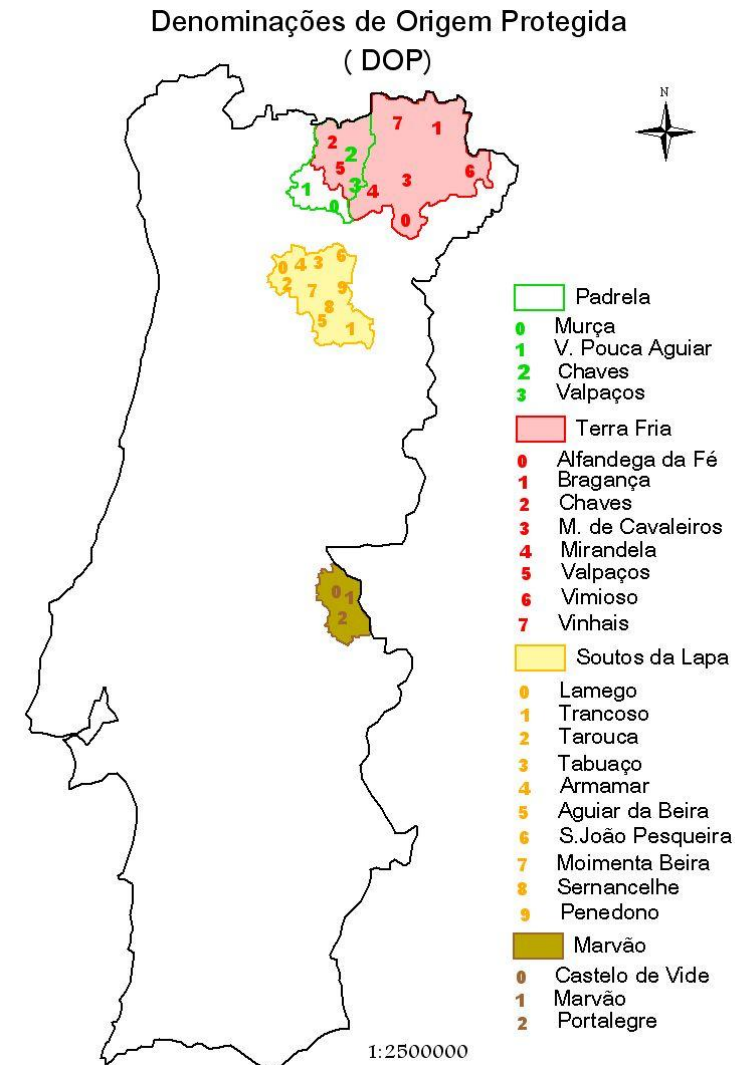
● Regiões de Proveniência: abrangem as zonas de Trás-os-Montes, Entre-Douro-e-Minho, Beira Interior, Beira Litoral

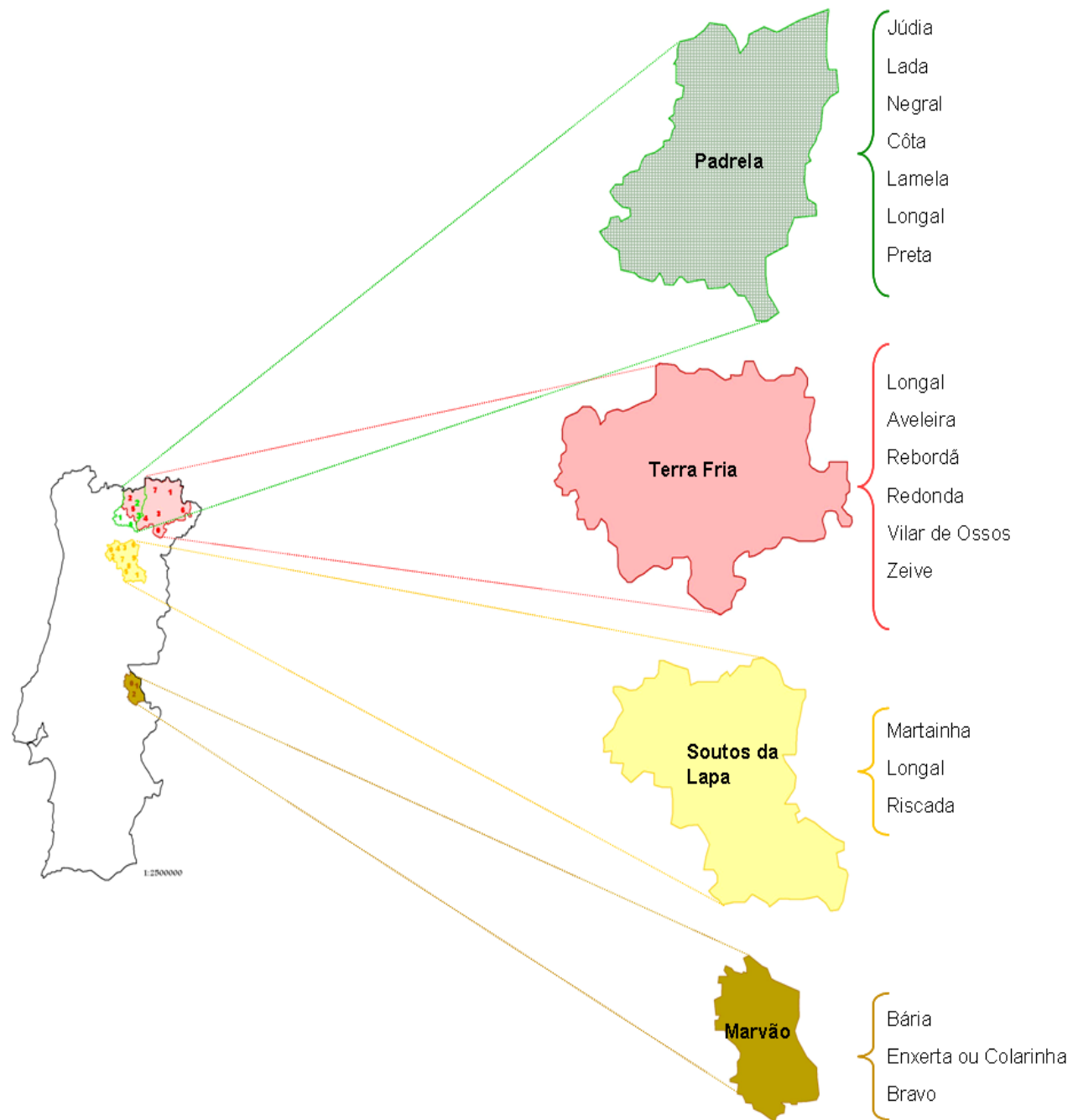
● Proveniências de Área Restrita: abrangem Alcobaça, Portalegre e Monchique

Denominações de Origem Protegida

Com o objectivo principal de valorizar e certificar as variedades portuguesas, tornou-se fundamental a delimitação de áreas com Denominação de Origem Protegida (DOP).

- Castanha da Padrela
- Castanha da Terra Fria
- Castanha dos Soutos da Lapa
- Castanha de Marvão





Variedades das 4 Regiões DOP

Projecto Agro 448

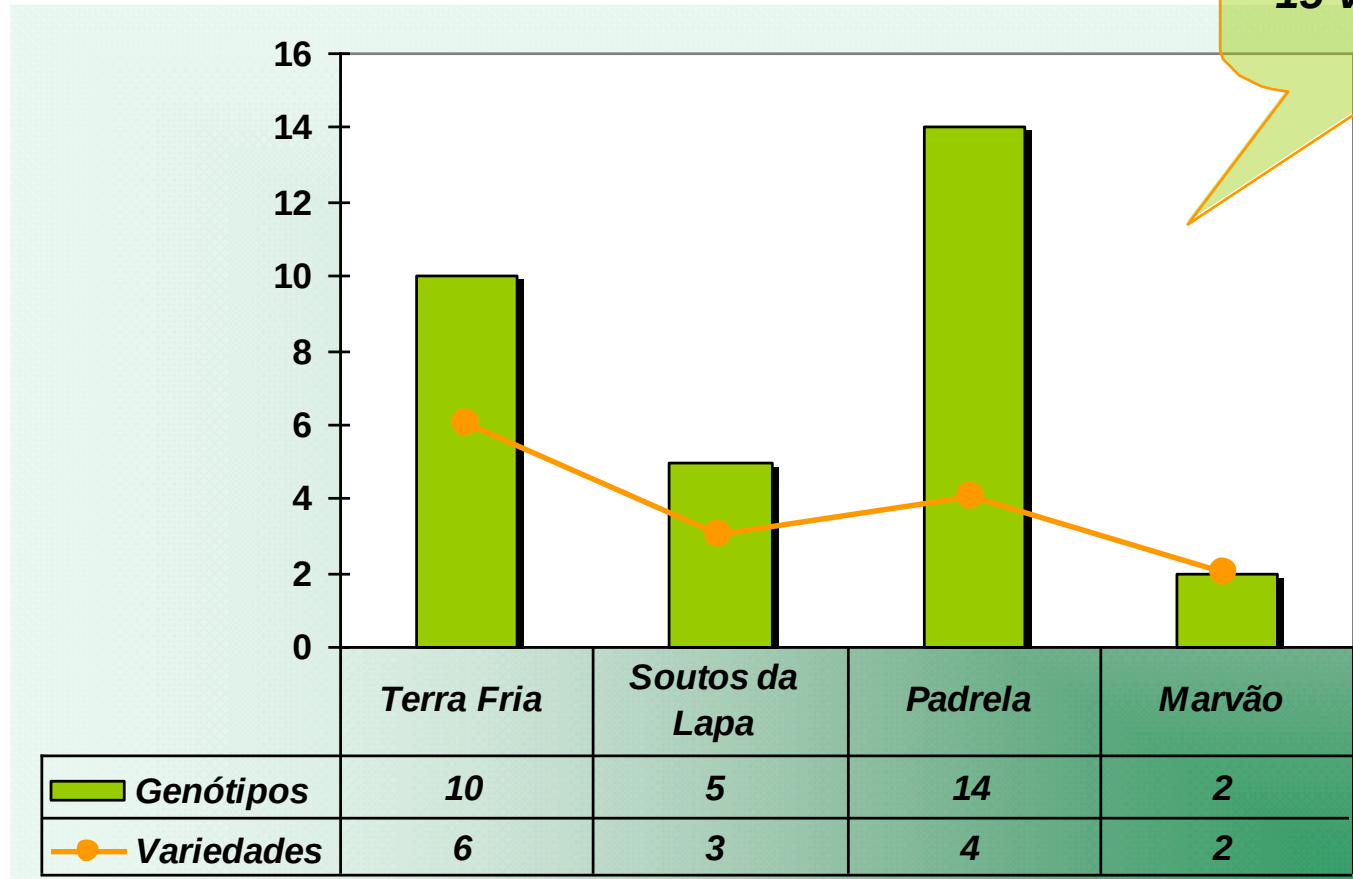


Variedades de Castanha das Regiões Centro e Norte de Portugal



Diversidade genética/DOP

103 Indivíduos
31 Genótipos
15 Variedades



Susceptibilidade de 62 variedades a *Dryocosmus kuriphilus* (Nº galhas/gomo G/B) avaliadas durante 8 anos (2005-2012) Sartor *et al.* 2015 , *Scientia Horticulturae*

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C. Sartor *et al.* / *Scientia Horticulturae* xxx (2015) xxx-xxx

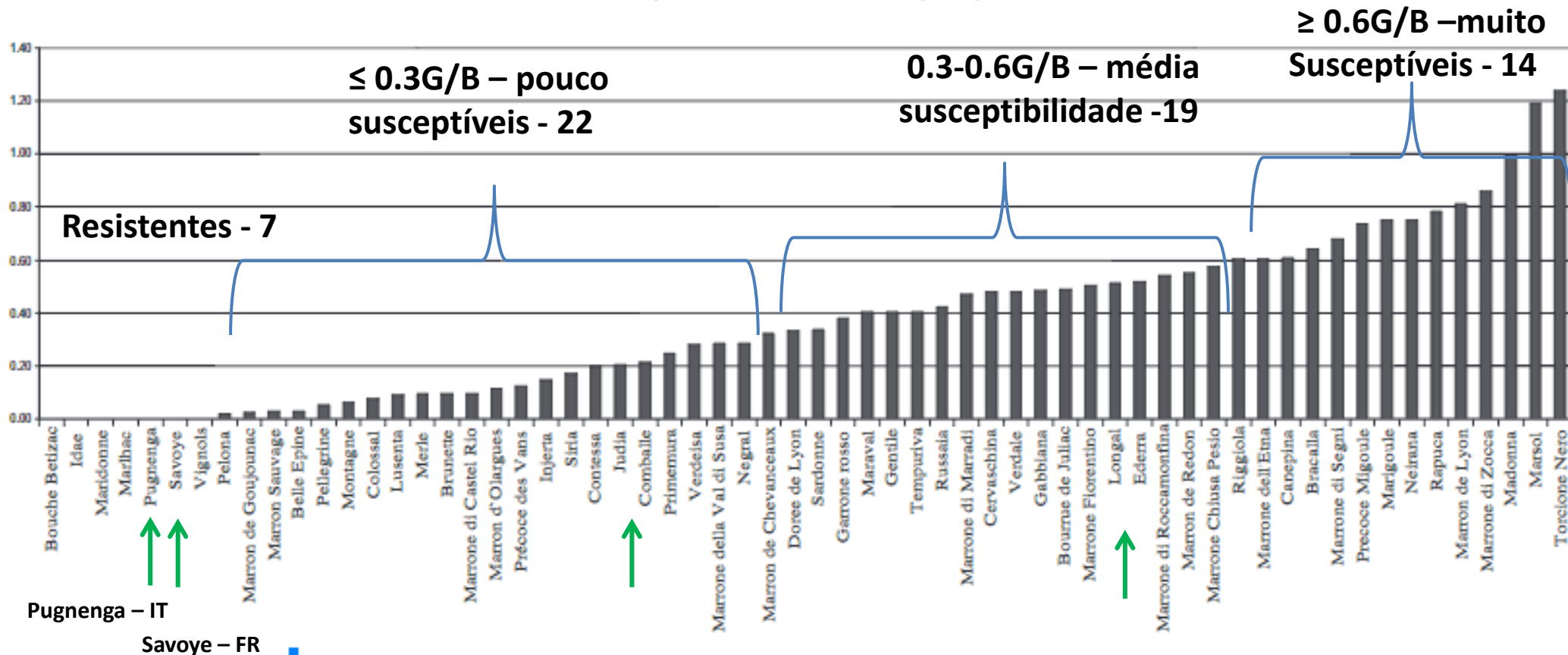


Fig. 5. Susceptibility (ratio No. of galls/No. of buds, G/B) to gall wasp in 62 cultivars of chestnut.

Obrigada



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