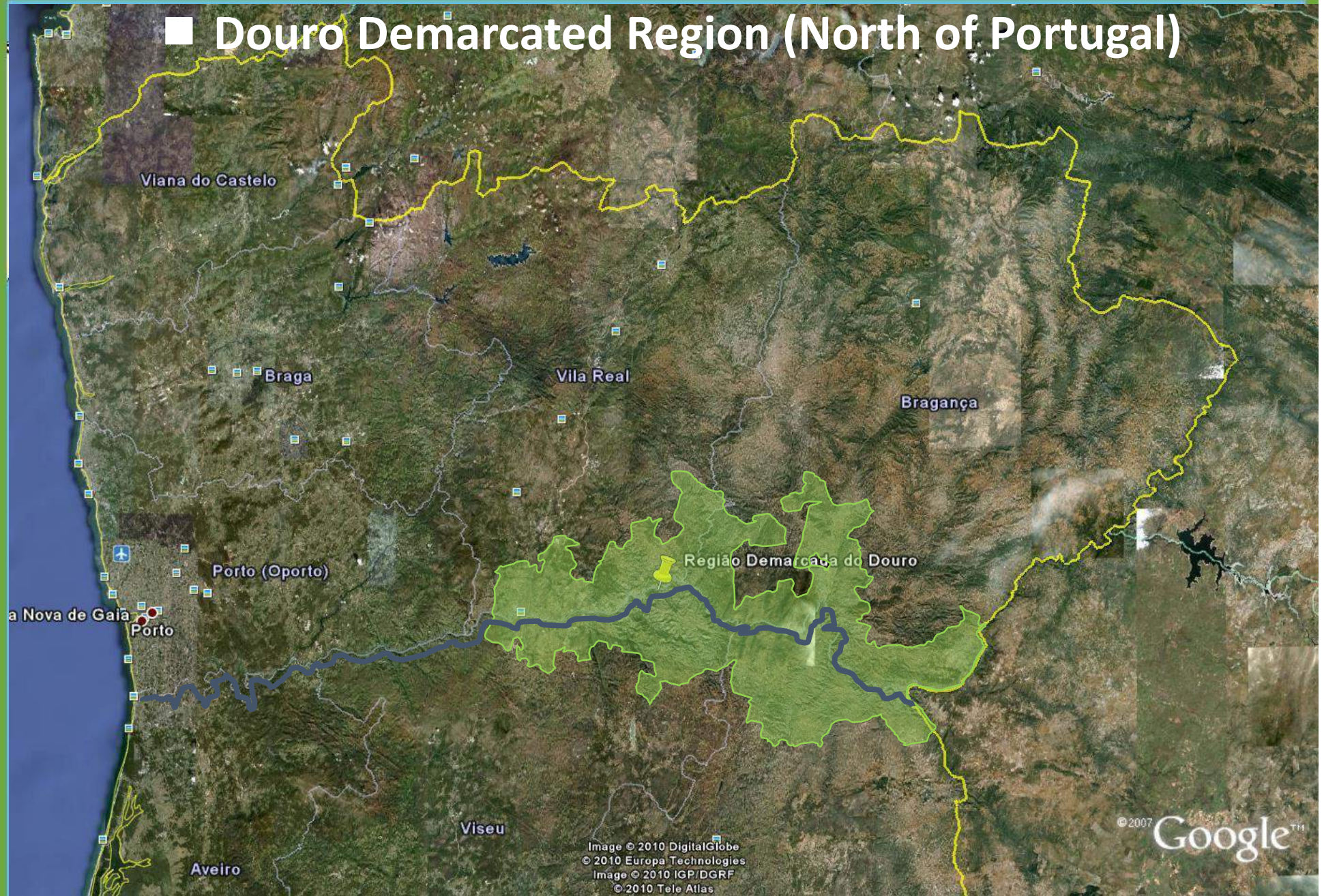


Functional biodiversity in European wine growing

Cristina Carlos



■ Douro Demarcated Region (North of Portugal)




■ Douro Demarcated Region



43 600 ha of vineyards

36 000 ha of steeply sloping vineyards!

Winegrowers	 ADVID	170
Surface vineyards (ha)		6 069.0
Integrated production		5 792.0
Organic		277.0

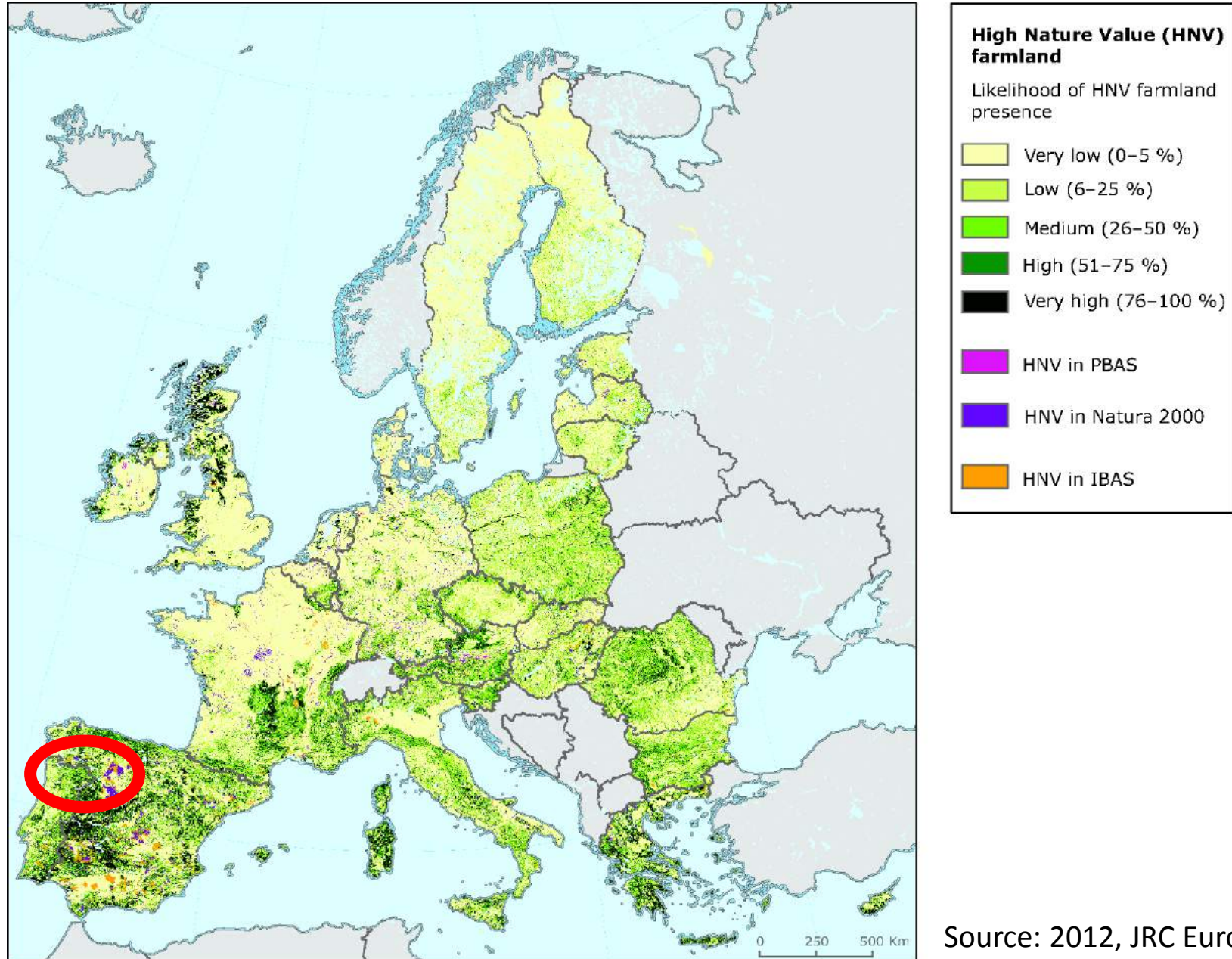


Douro DOC



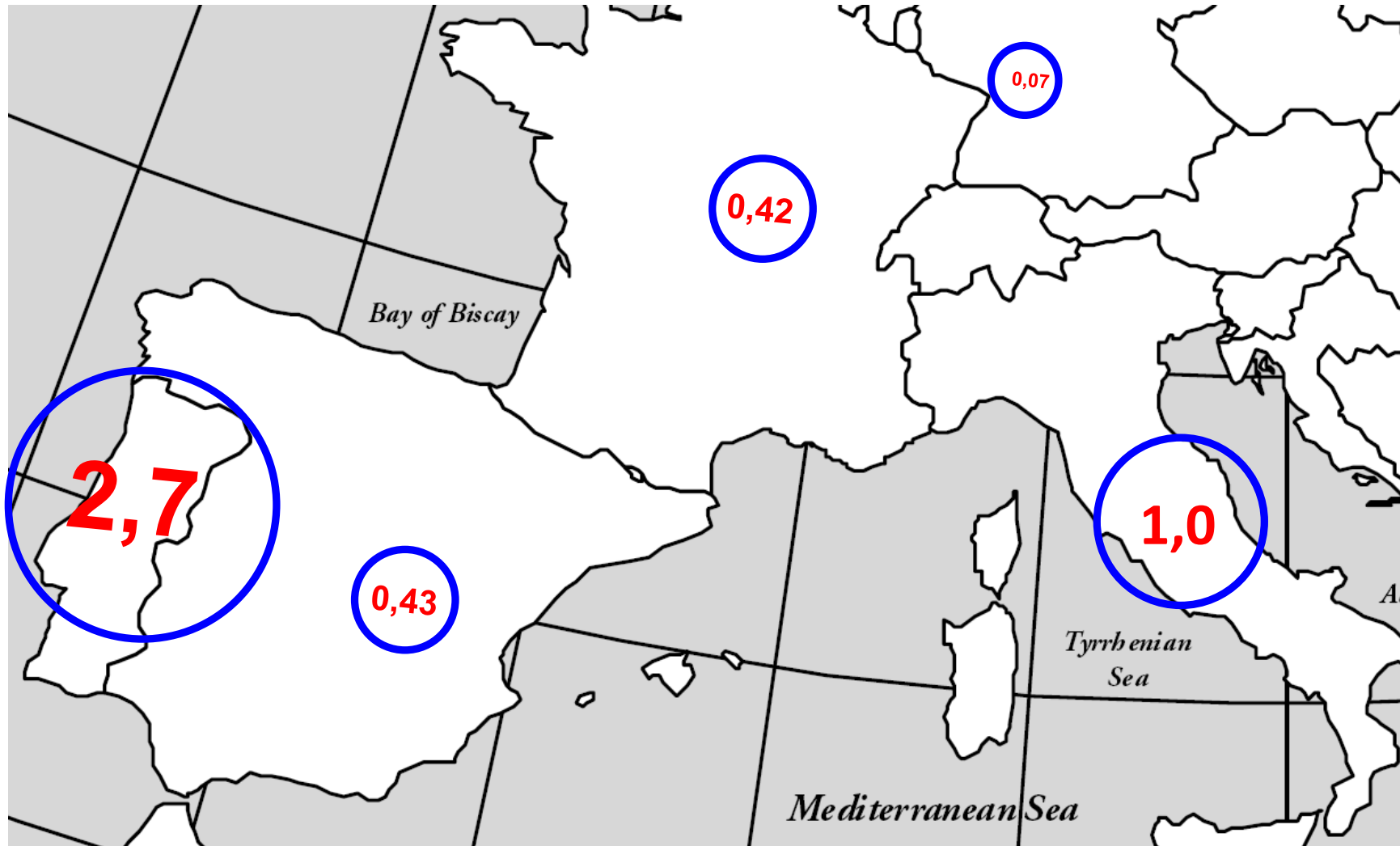
Port

■ High Nature Value Farmlands



Source: 2012, JRC European Commission

■ Number of native varieties of grape* / km2 in Europe



* In national official lists

A. Martins, 2010

■ Alto Douro Vinhateiro – classified by UNESCO in 2001



■ Dry stone walls



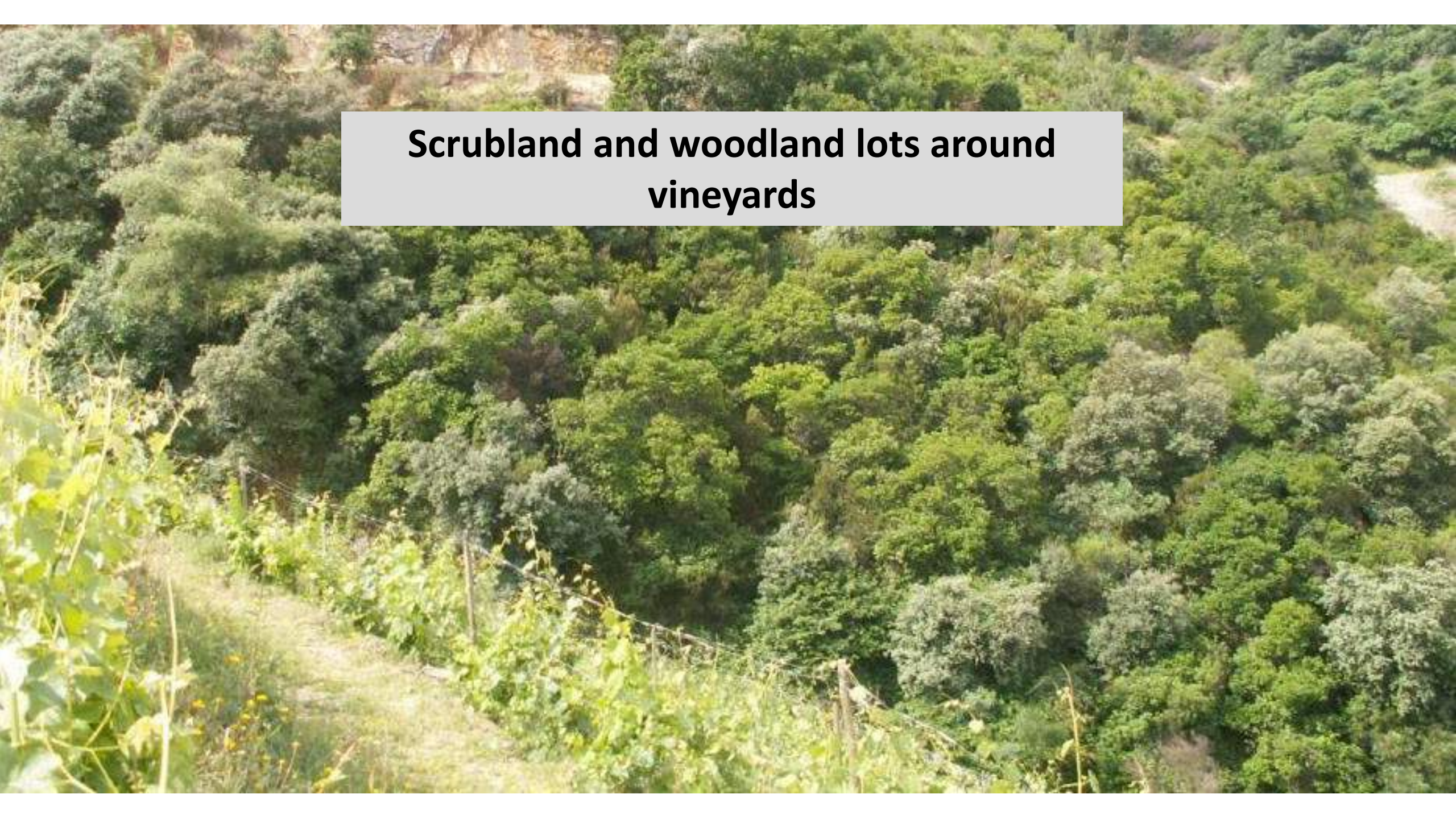
High presence of semi-natural areas and other crops

Riparian galleries



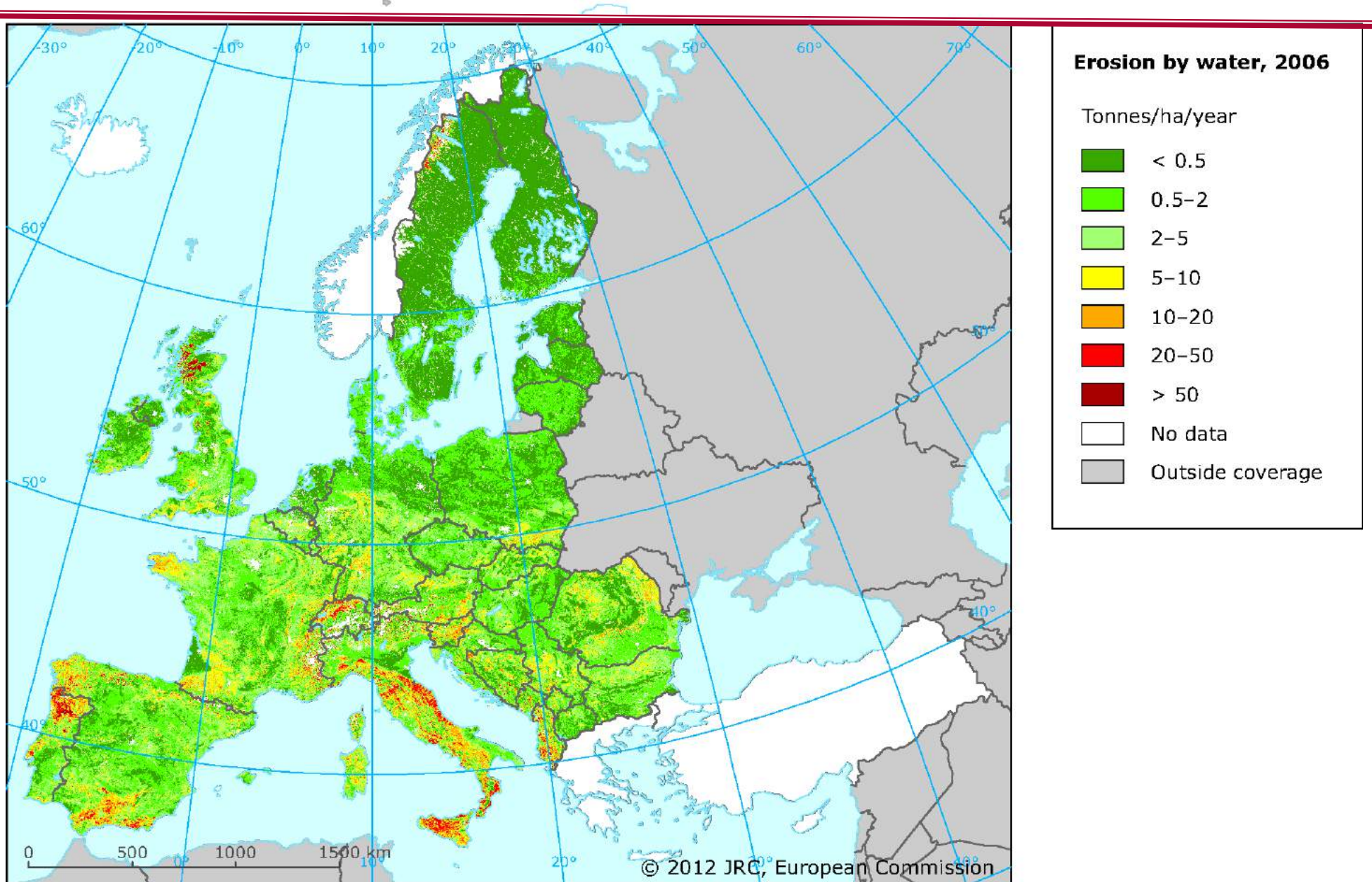
Patches of native vegetation on slopes



A photograph showing a dense forest of green trees and shrubs covering a hillside. In the foreground, there is a vineyard with rows of grapevines. A grey text box is overlaid on the image, containing the text "Scrubland and woodland lots around vineyards".

Scrubland and woodland lots around vineyards

■ High risk of Erosion



Implementation of natural ground cover





Big impact of climate conditions on ground covers (from June-September)



■ Conservation biological control strategy

Key-pests



Predators



Parasitoids



Biological control agents

A photograph of a vineyard with a dirt path and diverse flora. The vineyard is on a hillside, with rows of grapevines. A dirt path runs through the center of the vineyard. To the right of the path, there is a dense area of tall, pinkish-red flowers and other vegetation. The background shows more vineyard rows and some trees under a blue sky.

■ Conservation biological control strategy

1- To provide key ecological resources (SNAP) for beneficials (**habitat management**)

2- Avoidance of harmful practices to beneficials (**limited and selective use of pesticides**)

High diversity of flora support a high diversity of beneficial fauna

SNAP (Shelter, Néctar, Alternative food, Pólen)

Shelter



Néctar, Pólen



Alternative food





Local resources of flora



Implementation of conservation actions to enhance biodiversity of flora and beneficial fauna



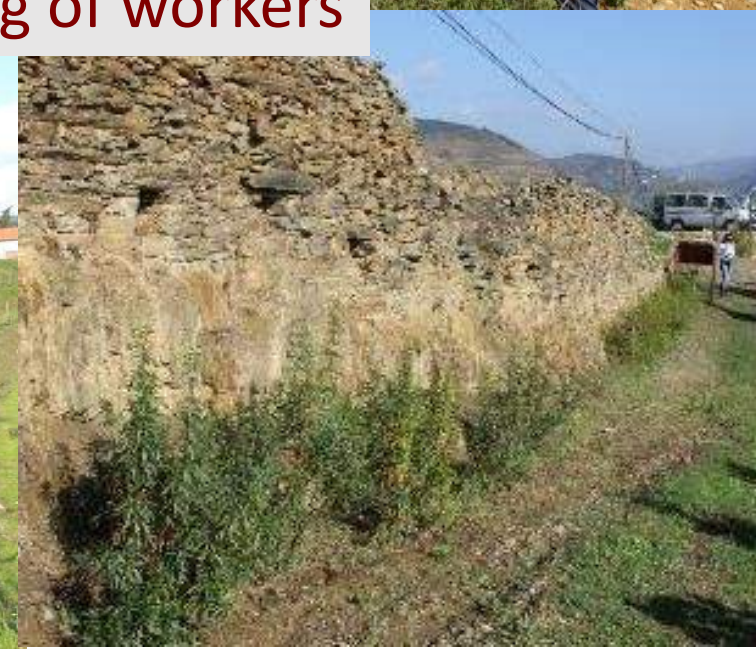
Maximização dos serviços do ecossistema
vinha na Região Demarcada do Douro



Demonstrating biodiversity in viticulture landscapes



And training of workers



□ Results of conservation actions (Hedges planted in 2013)



□ Results - training of growers (protection of native species)



- To limit / promote a selective use of pesticides (with a lower toxicity against beneficials)**

Integrated Pest Management / Integrated production (not conventional!)

- 1- Application of Preventive measures (ex. enhancement of functional biodiversity)+
- 2- Estimation of damages / economic threshold level +
- 3- Selection of protection methods (ex. cultural methods +biotechnical methods (mating disruption) +
- 4- Selection of pesticides authorized for IPM

- From 1997-2013 – A prior selection of less harmful pesticides, according to their toxicity (human, beneficials fauna, environment), was done by the National Authority**

Efeitos secundários dos inseticidas / acaricidas homologados em PI

ASSOCIAÇÃO PARA O DESENVOLVIMENTO DA VITICULTURA DURIENSE

Edição: Março de 2008


Subst. activa	Efeitos secundários sobre a fauna								
	coccinídeos	afídeos	ortópteros	aracnídeos	himenópteros	fitofagos	abelhas	organismos aquáticos	aves
<i>Bacillus thuringiensis</i>	○	○	○	○	○	○			
cifoxaostanho	⊙	⊙	●	●	●	⊙		■	
clorpirifós	○	●	●	⊙	●	⊙	■	■	■
dicofol	○	○	○	○	○	⊙		■	
erxifol (pó)	⊙	-	-	⊙	⊙	⊙			
fenopiriximato	●	⊙	●	⊙	-	⊙		■	
fenoxicarbo	○	-	⊙	⊙	○	○	■	■	
flufenoxurão	⊙	-	○	⊙	○	○	■		
fosalona	⊙	⊙	●	⊙	⊙	⊙●		■	
imidacloprido	⊙	○	○	⊙	●	⊙	■		■
indoxacarbo	⊙	○	○	⊙	⊙	○		■	
lufenurão	-	-	-	○	-	○		■	
malatión + óleo mineral	-	-	-	-	-	⊙	■	■	
óleo de Varão	○	○	○	⊙	○	⊙		■	
metoxifenozida	-	-	○	⊙	○	○			
tebufenozida	○	○	○	○	○	○		■	
tiametoxame	-	-	-	●	⊙	⊙	■	■	
spinosade	○	-	●	⊙	●	⊙			



Key-pest Grapevine moth	2013	
	total	Piretroids
Active ingredients	9	<u>0</u>
Comercial names	18	<u>0</u>

In 2014- With the implementation of the **National Action Plan for the sustainable use of pesticides**, following the publication of **DIRECTIVE 2009/128/EC**

- All the active ingredients available on market for a specific finality (ex. Grapevine moth) can be used, as long as growers respect their conditions of application (security interval and number maximum of applications). **They are now responsible for selecting according to toxicity, price and efficacy.**



Key-pest Grapevine moth	2013		2014	
	total	Piretroids	total	Piretroids
Active ingredients	9	<u>0</u>	22	<u>9</u>
Comercial names	18	<u>0</u>	71	<u>42</u>

The availability of such active ingredients on IPM programs **may conduct**, as a consequence, to:

- To negative impacts on beneficial fauna**
- To outbreaks of secondary pests** (mites, mealybugs)

**Obrigada pela
Vossa atenção!**

