



Rootstocks Breeding for Resistance to Grapevine Decline and Dieback in Southern Brazil



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Young Vine Decline in Brazil



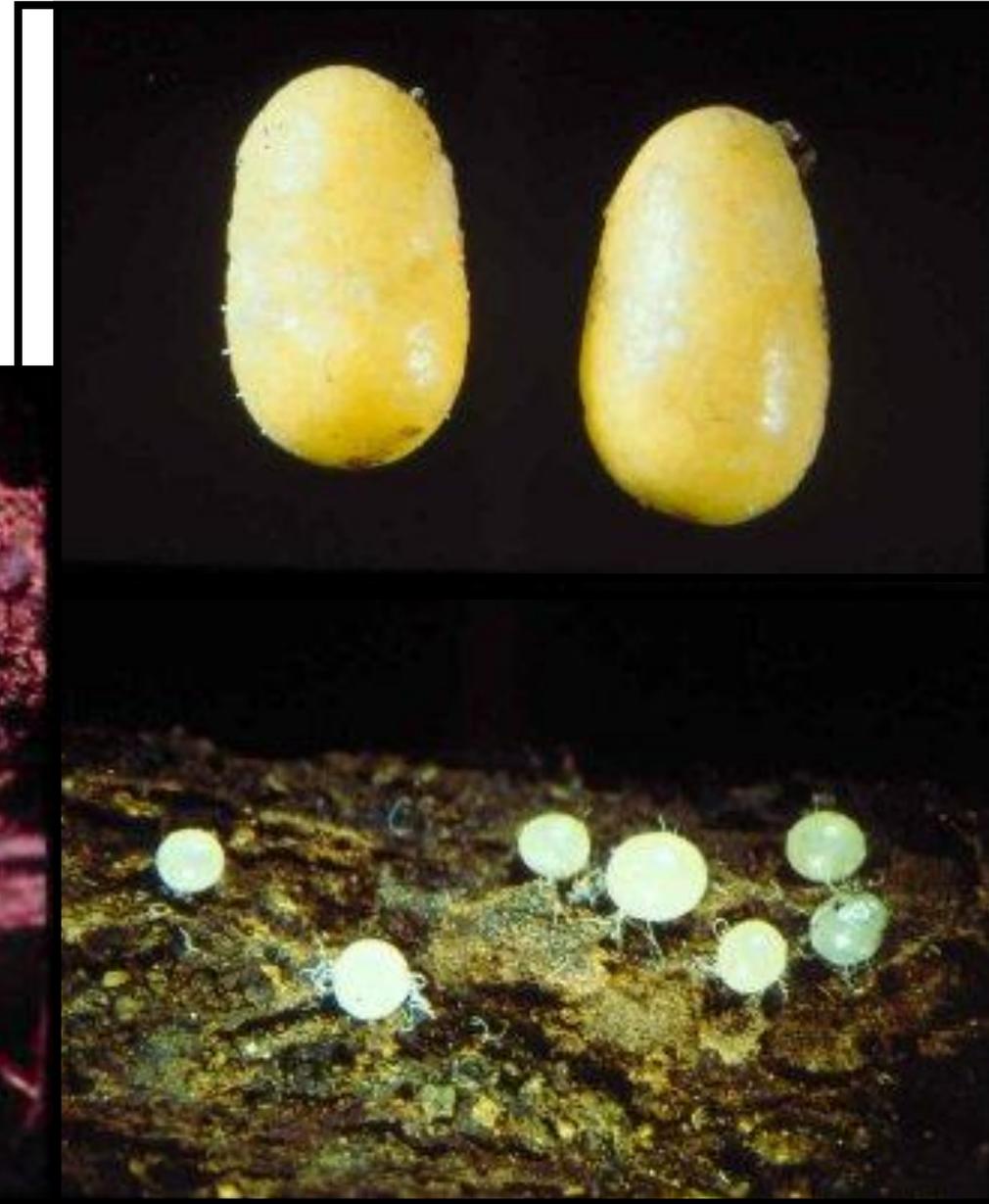
Ground-pearl / margarodes

(*Eurhizococcus brasiliensis*)

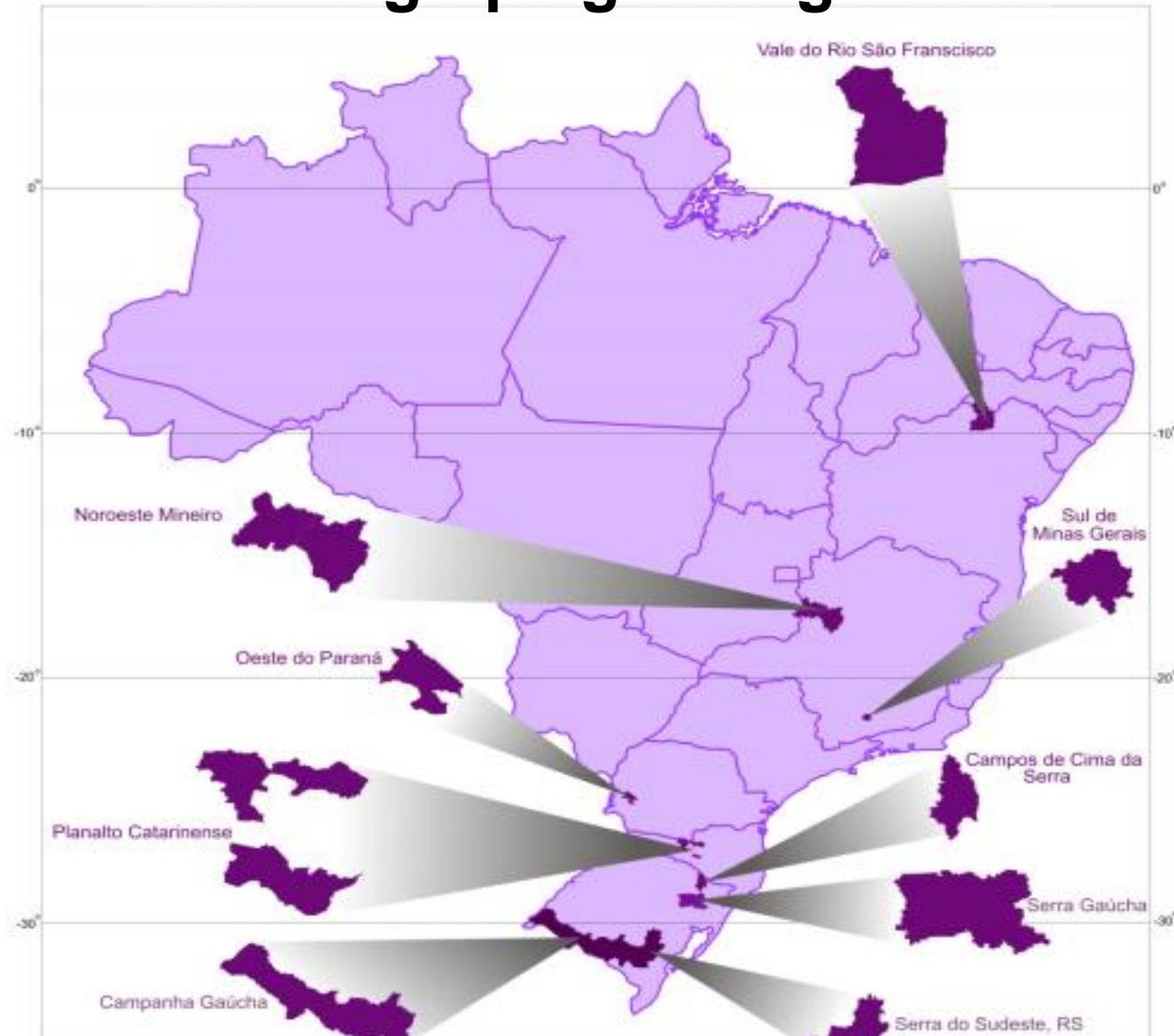
- Similar to:

- *Margarodes vitis* (Chile)

- *Margarodes prizkaensis* (South Africa)



Brazil: grape growing areas



**Young vine
decline**

=

**Ground-pearl/
Margarodes**

+

Soil fungi

+

Heavy soils

Eurhizococcus brasiliensis

Root:

- *Cylindrocarpon*
- *Fusarium*
- *Verticillium*
- *Cylindrocladium*

Wood:

- *Botryosphaeria*
- *Phaeoacremonium*
- *Phaeomoniella*
- *Graphium*

- High clay content
- Poor aeration

Roostock breeding target



Young vine decline

=

Ground-pearl/
Margarodes

+

Soil fungi

+

Heavy soils

Eurhizococcus brasiliensis

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Area with high incidence of grape decline

- Videira Experiment Station



Epagri – Videira Experiment Station

Roostock breeding program:

- 1. Identification of resistance sources**
- 2. Creation of new rootstocks with:**
 - Resistance to grape decline**
 - Adaptation**
 - Low vigor**

Resistance to young vine decline

- Trial results:

1. High resistance:

- *Vitis caribaea* hybrids (IAC572, IAC571-6)
- *Vitis shuttleworthii* (Everglades, FLA))
- *Vitis palmata* (Everglades, FLA)

2. Medium resistance:

- *Muscadinia rotundifolia*
- *Vitis shuttleworthii* (dry soils)
- *Vitis champinii*

3. Low resistance:

- *V. aestivalis*, *V. riparia*, *V. rupestris*, ...

Resistance to young vine decline

- wild species trial:

Vitis shuttleworthii
(from Everglades, FLA)

Vitis palmata
(from Everglades, FLA)

Vitis shuttleworthii
(dry soils)



Vitis palmata, *Vitis shuttleworthii*

- Wild grapes from Everglades (Florida, USA) -

- Adapted to waterlogged soil conditions
- Possible sources of resistance to root decay fungi
- Poor drought resistance
- Hard to establish in dry soils
- Bad characters transmitted to the progenies
- Need more generations of crosses



Resistance from *Vitis caribaea*

- 3rd year results:

Roostock	plants with decline symptoms (%)		ground pearl cysts (No.)	
	<i>Insecticide</i> <i>yes</i>	<i>no</i>	<i>yes</i>	<i>no</i>
420 A (<i>berlandieri</i> x <i>riparia</i>)	4	88 a	0,6	13,8
Paulsen 1103 (<i>berland.</i> x <i>rupestris</i>)	0	60 a	1,2	22,0
R99 (<i>berlandieri</i> x <i>rupestris</i>)	4	68 a	6,7	33,0
VR 043-43 (<i>vinifera</i> x <i>rotundifolia</i>)	0	60 a	6,0	17,2
Dog Ridge (<i>V. champinii</i>)	0	48 a	8,2	37,2
IAC 572 (<i>caribaea</i> x 101-14 Mgt)	-	0 b	-	43,8

Differential behavior of grape roostocks in absence of chemical control of ground pearl (*Eurhizococcus brasiliensis*).

IAC 572

(*V. caribaea* x 101-14)



Paulsen 1103

(*V. berlandieri* x *V. rupestris*)



420A

(*V. berlandieri* x *V. rupestris*)



IAC 572

(*V. caribaea* x 101-14 Mgt)

- Absence of winter dormancy
- Damage by frost – 2013 (-7°C)
- Death of young plants in cold areas
- Excessive vigor



IAC 572

(*V. caribaea* x 101-14 Mgt)

- Can be selfed (hermafrodite in protected environment)
- Selfing → shortcut to create new roostocks



Rootstock breeding based on *Vitis caribaea*

→ Selection in a “high mortality” sites

- Seedling population: IAC572 x IAC 572
- 2012: 840 seedlings planted
- 2015: 51 selections based on:
 - no symptoms of decline
 - winter dormancy (~50%)
 - late bud break
- Evaluation of 51 clones with replications in two new sites (Epagri + private vineyard)
 - 21 clones: no symptoms of decline
 - 20 clones : minor problems (in observation)



Rootstock breeding at Epagri:

- **Resistant clones available, scion performance unknown**
- **Rootstock trials with 21 clones → future releases**
- **Crosses with other sources of resistance**
- **Soil fungi resistance to solve an insect problem!**
- **Same pathogenic fungi present in other countries**

Thank you!

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