



Dr Strauss Ferreira

# Management of stress related vine diseases in the nursery



# Black Goo

- Best known stress related disease
- Drastic reduction in survival rate-grafted grapevines
- All rootstock material infected
- Symptomless carriers of Black Goo complex  
Pa. chlamydosprum, Pm. aleophilum
- Any stress conditions will trigger these fungi-  
overcome resistance of plant.
- Rootstocks react by forming tyloses-plug  
xylem vessels
- Uptake of water& nutrients restricted
- Negative influence on callussing-toxin



# Tyloses in rootstock xylem





# Infected rootbase & rootstock

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# STRESS CONDITIONS

- Anatomical
- Physiological
- Environmental
- Diseases
- Endophytes other than Black Goo
- Morphology of roots tock/scion material



# Stress Conditions

## Anatomic/Physiologic

### -Grafting process

- Grafting unnatural process
- Stress on rootstock and scion cultivar
- Some graft combinations higher stress
- Success of grafting depends on compatability
- Incompatibility ► no take
- Affinity ► degree of take obtained
- After 15 yrs in vineyard uneven thickening of trunk between root- and scion
- difference in nutrient uptake and use
- Reduction growth & production



# Stress Conditions

## Physiologic

- Nutrient status grafting material  
Deficient nutrients-micro elements  
responsible auxin&cytokynin  
production ► callussing& rootformation
- Carbohydrate contents-estimated grafted  
material use > 50%  
Affinity problems between scion/rootstock  
difference in nutrient contents and uptake



# Stress Conditions

- Environmental
  - Sufficient oxygen
  - Relative high temp 25-28°C
  - High humidity 85 – 100%

Drying out catastrophic results on callusing



# Stress Conditions

- Fungal diseases
  - Powdery mildew-reduces nutrient reserves & kills cambium
  - Downy mildew –reduces nutrient reserves
  - Phomopsis viticola –kills cambium& xylem tissue



# Stress Conditions

- Endophytes-other than Black Goo
  - Viruses –leaf roll, stem pitting
  - Bacteria – crown gall (*Agrobacterium vitis*)  
-bacterial blight (*Xylophilus ampelinus*)



# Morphology of rootstock

Cut open-white to yellowish colour

- No discoloration of Xylem tissue
- Endophytes –no discoloration xylem tissue before grafting



# Selection of grafting material

- Only cuttings from vines regularly monitored for and free of diseases and pests
- Do not take cuttings from stressed vines
  - water stress or nutrient deficiency
- Cuttings taken at absolute dormancy  
(1 month after leaf-fall-1 mo prior to budding)
- Hydrate cuttings +/- 8hr in clean water
- HWT immediately (50°C -30 min)
- Cool immediately after HWT- 30 min



# Nursery

- Plant out in well aerated soil with a good drainage capacity free of nematodes
- Look out for Sclerotium- kill up to 1m
  - dip in Bio-Tricho before planting
  - Brassicol -apply on the row
- Avoid drying out of soil around plants
- Control programme for powdery and downy mildew
- Control programme root diseases



# Black Goo

- Shoots 5-10cm
  - Phosphoric acid-3 weekly applications
  - + well balanced fertiliser-Verte Guano
  - Will also control downy mildew, Phytophthora and Pythium
  - Rotate with any other downy mildew fungicide-2 weeks
  - Phosphoric acid etc.



# SUMMARY

- Black Goo most destructive disease complex of grafted vine plants
- Rootstocks symptomless carriers
- Stress conditions trigger Black Goo
- Select healthy material
  - No nutrient deficiency
  - Same morphology
  - Disease free plants
- Constant monitoring of soil moisture
- Follow disease control programme + balanced nutrition



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