



# Minimizing water use conflicts of table grape production in Germany and Israel

## Screening of German and Israeli table grapes with regard to drought stress tolerance



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### Introduction

The effects of climate change will influence agricultural crop production. Drought stress might decrease quality and/or yields of agricultural crops in Germany and Israel. In Germany natural precipitation is hardly able to fulfil the water requirements of table grapes, the cultivation in Israel needs an extensive irrigation. Both situations, in Germany and Israel, will lead to water use conflicts.

Since 2000, table grape production in Germany is no longer limited to wine-growing areas and the market potential is remarkable. The latest available data (2013) states an yearly average consumption of 5.1 kg of table grapes per person and they are the 3<sup>rd</sup> favourite fruit in Germany<sup>1</sup>. In 2013, approximately 320.000 t fresh table grapes were imported and only a small percentage were produced in Germany<sup>1</sup>.

### Objectives

**A) Characterization of the four most relevant German and two Israeli table grape varieties according to their physiological drought response.**

**B) Assessment of the effect of drought stress on relevant internal and external quality traits.**

**C) Analysing rootstocks' influence on drought stress and evaluate rootstock-scion interaction for selected cultivars and rootstock genotypes.**

**D) Evaluation of selected sensors regarding their ability to identify drought stress.**



Picture 1 & 2: Table grapes „Palatina“ (top) and „Fanny“ (bottom), Source: LVWO Weinsberg.

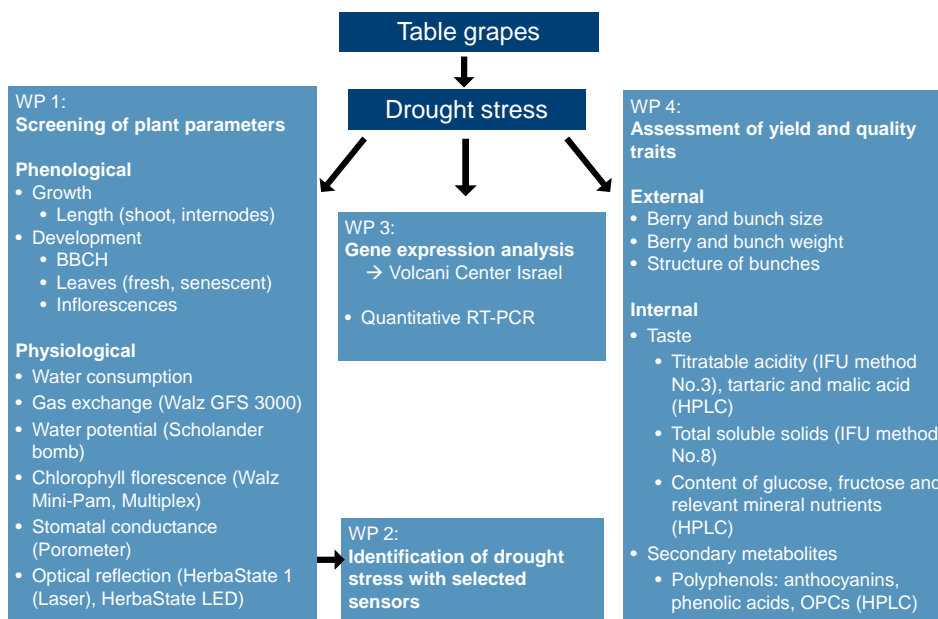
### Expected results

- o Determination of physiological drought stress reaction of selected table grape cultivars
- o Identification of cultivar specific implications of physiological drought stress reaction
- o Evaluation of different rootstocks, their influence on drought stress reaction and the rootstock-scion interaction
- o Coupling different states of water supply and their effects on yield and quality with sensor detectable changes in appearance of grapevines

### Aims

- o Researching physiological reactions of plants and find solutions how plants and humans can adapt to coming environmental changes.
- o Determination of physiological reactions of table grape varieties on drought stress in order to evaluate the effect of water limitation on plant growth and productivity.

### Materials and Methods



**A) Greenhouse experiment 1: Screening of different table grape varieties**

- 8 varieties (4 German and 2 Israeli table grapes, 2 rootstock genotypes)
- 3 stress levels
- 2014:
  - o Planting : Week no. 25-27
  - o Start Stress: Week no. 38
  - o Harvest: Week no. 44

**B) Greenhouse experiment 2: Screening of rootstock-scion interactions**

- 4 rootstock-scion combinations
  - o 2 varieties (Muscat Bleu (Germany) & Crimson Seedless (Israel))
  - o 2 rootstock genotypes (140 Ruggeri & SO4)
- 3 stress levels

Stress levels	Irrigation (in % AWC)
no stress (=control)	75
moderate	50
intensive	25

Table 1: Stress and irrigation levels (in % available water content).

Figure 1: Work packages of PhD-thesis.



This study is conducted within the framework of the Anton & Petra Ehrmann-Stiftung Research Training Group „Water – People – Agriculture“ at the University of Hohenheim.

www.water4use.info

Source 1: <http://www.bmel.de/SharedDocs/Pressemitteilungen/2014/188-Zahl-der-Woche-Tafeltrauben.html> (21.02.15).