ARIMNet2 Young Researchers Seminar

“How to better involve end-users throughout the research process to foster innovation-driven research for a sustainable Mediterranean agriculture at the farm and local scales.”

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‘Studying of the periods sensitivity to water deficit treatments and determination of water stress effects on yield components, quality components and grapevine growth’

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Europe presents the largest vineyard area in the world, mostly located in Mediterranean areas (Mullins et al., 1992).

‘Climate Change: Changes in the global climate’: Physical Phenomenia
Exp; changes in precipitation patterns, increased prevalence of droughts, heat waves, and other extreme weather, etc.

According to climate change models, an expected increase of the temperature leading to a decrease of water availability, especially in Mediterranean areas (IPCC, 2007; Schultz, 2000).
Grapevine production & Climate change

- In the Mediterranean zone, **Water stress** is considered to be the most important factor **limiting grapevine growth** and **production** (Patakas et al., 2002; Gomez et al., 2004) according to the grapevine growth stages.

- In this way irrigation becomes critical activity for successful production. Irrigation should be **efficient and effective** to avoid excessive application.

- Efficient irrigation systems require the selection of an **appropriate method** for the crop grown, adequate monitoring of the irrigation system and of water delivery, and **appropriate application rates** depending on the growth stage of the crop.
OBJECTIVE & HYPOTHESES

Objective(s) / Research question(s)

- What are the effects of water scarcity on critical growth stages for different grape varieties?
  - ‘phenological stages’ (Budburst-Flowering-Fruit set-Veraison-Harvest)
  - (variety, roostock-scion interaction)
- Determination of water stress effects on quality and yield components....?
  - (berry composition, berry size, berry coloration etc.)
  - (shoot growth, canopy management, leaf area, leaf chlorophyll content, photosynthesis etc.)
- Determination of water status in soil and vine leaf.....?
  - (Monitoring soil water content and leaf water potential)

Hypotheses

- Water deficit treatments affect phenological stages
- Berry composition can be enhanced (Anthocyanin content, antioxidant activity etc.)
- Irrigation schedule can be optimized for different grape varieties (table grape, raisin, wine grape)
- It is emphasized that: ‘ Water scarcity will be the most important problem as a result of climate change. Therefore it will be revealed that grape growing can be done with minimum water usage.'
METHODOLOGY

Material
- Different popular grape varieties (table grape, raisin and wine grape varieties)
- Subsurface drip irrigation system (min. water usage)
  - 40cm depth from the surface,
  - pressure regulating drippers have 2,5 lt/hour flow rate
  - Distance between drippers: 40cm

Method
- 3 irrigation treatments; Stress 1 (mild), Stress 2 (severe), Control.

INVolVEMEnt OF STAKEHOLDERS
- Researchers from different countries (Research institutes, Faculties...)
- Agricultural companies; exp: Irrigation system company
EXPECTED RESULTS / IMPACT (INNOVATION)

Grape quality, yield, vine growth
- It will be determined that water deficit effects on grape quality, yield components and vine growth. Also it will be researched response of all varieties to water stress.

Phenological stages
- It will be observed that water stress effects on phenological stages. (earliness is important for marketing)

Efficiency of subsurface Irrigation system
- It will be revealed that efficiency of subsurface drip irrigation system and its usability for grape growing.

Optimization of water usage
- It will be found out that minimum level of water usage to achieve appropriate quality standards for each grape varieties.
PROPOSED PARTNERSHIP

Partner 1: Irrigation system company
- We will use subsurface drip irrigation systems in this Project. Therefore we can contact with an irrigation company in an attempt to get support for our methodology. Also they can provide us financial support. In this way we can use and study their products and we can share all results with them.

Partner 2: Farmers Vineyards
- We will determine the water deficit effects on different varieties. For example wine grape varieties, table grape varieties and raisin varieties. Therefore we should find demonstration farmers and vineyards for performing our experiment in different regions.

Partner 2: Research Institute/Agricultural Faculty….etc…..???
Thank you for your attention!