



FERTINNOWA

WORKING SESSION 4: Optimising nutrient management of fertigated crops, which tools?

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PARTICIPANTS: Everybody present

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Our objectives

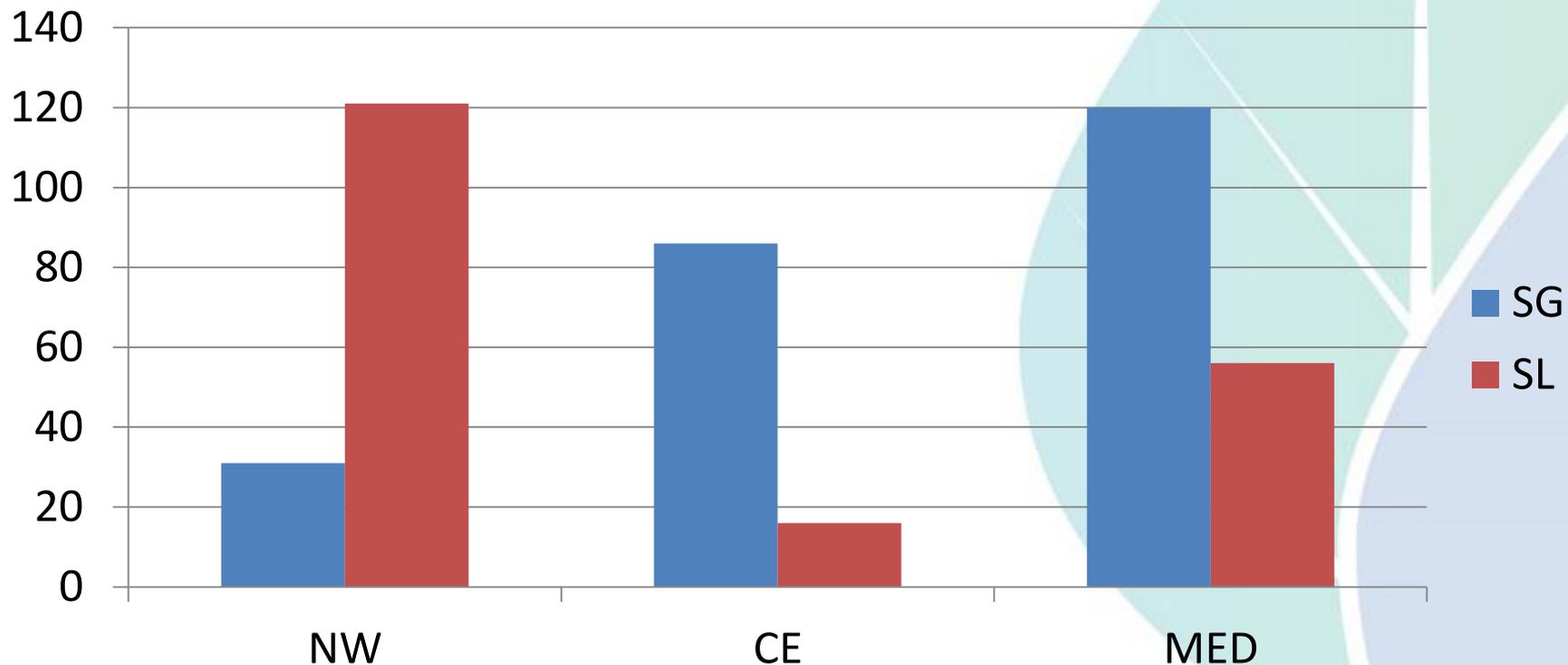
- To identify the best tools, considering:
 - Crop type, geography (water quality, irrigation frequency)
 - Different technical level of growers
- To identify what is preventing more adoption of these tools
 - Do we need modifications or newer tools,
 - Do we need carrots (e.g. subsidies) or sticks (e.g. legislation)
- To determine how we can increase adoption?

To evaluate available tools, consider:

- effectiveness
- ease-of use (“farmer-friendly”)
- robustness
- existing use in horticulture/agriculture (feedback from growers)
- availability of relevant background information
 - reference values (“limits”) for sensors
- the need for support
- context: crop type, farming system
- suitability to different types of growers
- cost
- anything else? Suggestions?

Preliminary results from survey

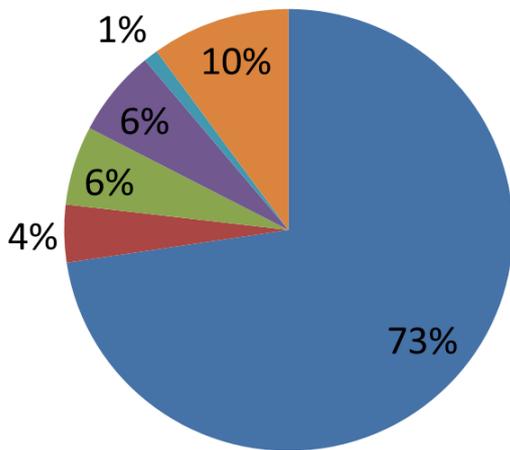
GENERAL OBSERVATIONS – soilgrown vs soilless



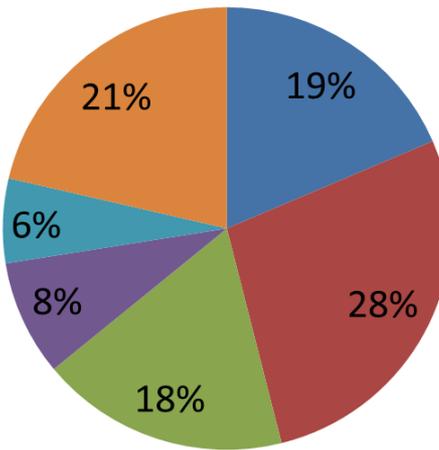
Preliminary results from survey

Main fertilisation method

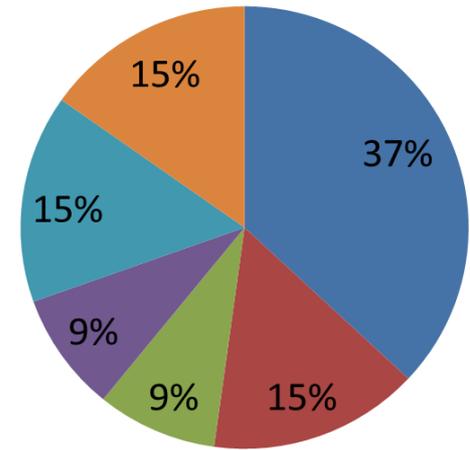
North-west



Central-east



Mediterranean



■ Fertigation

■ Manure

■ Broadcasting of quick release fertiliser

■ Foliar application

■ Localised banding at planting

■ Broadcasting of slow release fertiliser

Preliminary results from survey

GENERAL OBSERVATIONS - ATTITUDES

- North-west
 - Growers generally aware that tools available
 - Higher precision on the fertigation system is required
 - Continuously nutrient monitoring
 - Higher automation on the fertigation management required
 - Understand more the crop requirements
 - Growers do not follow nutrient recommendation schemes as they are too old
 - When growers over fertilise is for safeguarding yield and quality

Preliminary results from survey

GENERAL OBSERVATIONS - ATTITUDES

- Central-east
 - High concern for the **cost** of implementing new technologies
 - High concern for the cost of fertiliser used in fertigation
 - Automation of the systems is important



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Preliminary results from survey

GENERAL OBSERVATIONS - ATTITUDES

- Mediterranean
 - Fertigation not investment priority, if they already have a system
 - Automation is important
 - Uniformity on the fertigation system
 - Understand more the crop requirements and link them with the fertigation system
 - Recommendation schemes not suitable resulting in yield penalties
 - When growers over fertilise is for safeguarding yield and quality

Support that growers consider needing

- North-west
 - Learning from the experiences of other irrigators/fertigators
 - Visiting sites which demonstrate fertigation best practices
 - Direct face-to-face access to fertigation specialists and leading researchers
 - Affordable real time nutrient diagnostic tools
 - Nutrient management decision support system for portable devices (tablet, smartphone)

Support that growers consider needing

- Central-East
 - Updated nutriment recommendation guides
 - Visiting sites which demontsrate fertigation best practices
 - Learning from the experiences of other irrigators/fertigators
 - Document about technologies-comparisons of systems
 - Direct face-to-face access to fertigation specialists and leading researchers

Support that growers consider needing

- Mediterranean
 - Financial support/ subsidies to apply BMP or to implement technology
 - Affordable remotely accessed automatic sensor-activated system for fertigation and irrigation management
 - Visiting sites which demonstrate fertigation best practices
 - Direct face-to-face access to fertigation specialists and leading researchers
 - Affordable real time nutrient diagnostic tools

PRESCRIPTIVE nutrient management

- Decision Support Systems (DSS) to calculate fertiliser requirements
 - Calculations made for days, weeks, (entire crop)
 - Different degrees of complexity, regarding simulation of different terms
 - Ideally, few inputs which are readily available to growers/adviser

CORRECTIVE nutrient management

- Frequent assessment required
 - To enable rapid correction when frequent N addition
- Soil solution analysis
 - Dutch 1:2 soil:water method
 - Soil solution sampling with ceramic cup samplers



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CORRECTIVE nutrient management

- Traditional plant analysis
 - Leaf analysis
 - Mostly used for diagnosis of nutrient deficiencies
 - Petiole sap analysis
 - Some use in particular cases
- Proximal optical sensors
 - Canopy reflectance, chlorophyll meters, fluorescence sensors
 - Canopy reflectance used with commercial cereal crops

Our objectives again

IN THE CONTEXT OF LOW LEVEL OF ADOPTION OF THESE TECHNOLOGIES, OUR JOB NOW IS:

- To identify the best tools, considering:
 - Crop type, geography (water quality, irrigation frequency)
 - Different technical level of growers
- To identify what is preventing more adoption of these tools
 - Do we need modifications or newer tools,
 - Do we need carrots (e.g. subsidies) or sticks (e.g. legislation)
- To determine how we can increase adoption?

GETTING STARTED

- Order of discussion
 - 1) Vegetables
 - 2) Fruit trees
 - 3) Ornamentals
- For each crop type and cropping situation, identify the best techniques considering:
 - Effectiveness
 - Farmer-friendliness
 - Robustness
 - Cost
 - etc.

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DISCUSSION PART

Report of exchanges between participants
Overview of raised issues and proposed solutions



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What are the best tools ? - 1

- NUTRIENT MANAGEMENT

- NW REGION

- Rules are not so strict as in central Europe, but farmers worried about environment.
 - Open to new technologies. However, sometimes the technology is not reliable and don't get expected results. Cost is also an issue among some growers
 - Irrigation seems to be more a problem than fertilization at this time since growers are afraid of changing laws and increasing water price

What are the best tools? - 2

– MEDITERRANEAN REGION

- Fertigation is not an investment priority
- Don't trust in recommendation schemes, growers think they lose yield
- Concerns not only on yield, but also in crop quality and environmental impact
- Growers need the adoption of new technologies to comply with the law in Nitrate vulnerable zones
- Priority: to work with "good" growers, open to adoption of new technologies (motivated growers)
- Look for technologies that allow the grower a rapid response: rapid test of nutrient deficiencies
- Need of adaptation of the nitrates law. Differences between regions and global values are given. Grower don't have enough information on crop needs . Need to inform about interpretation of soil and plant analysis from laboratories

What are best tools? - 3

– CENTRAL REGION

- Information is needed not only to growers, also to field advisors. They provide the recommendations to growers
- Main problems are not yield or quality, but environmental
- Environmental problems are related to improper irrigation management

How we can increase adoption? - 1

- Need motivated growers and field technicians. Growers follow their recommendations
- Information at research/training institutions should get to the growers and technicians
- Need of more face to face meetings. Growers learn from experiences from other growers
- Available tools may work different for different growing systems. Need to tailor solutions. For example:
 - In soil crops, DSS to calculate fertilizer requirements. They may be available but could be complicated to use and their use is discouraged. Sometimes growers need to be taught by other growers
 - In soilless crops, growers have acquired other skills and they seem more willing to adopt DSS systems