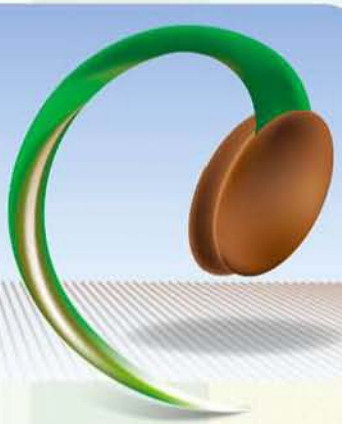
ESA 2020



XVI European Society for Agronomy Congress

1 to 3 September, 2020 - **Sevilla - Spain**

SMART AGRICULTURE FOR GREAT HUMAN CHALLENGES

BOOK OF ABSTRACTS

Organizes:

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Technical Secretariat:

VIAJES El Corte Inglés CONGRESOS

WELCOME

Dear participant in the ESA congress,

First, on behalf of the Organizing Committee, I would like to apologize for the alteration of the expected organization of the ESA congress due to the COVID pandemic situation. Our first idea was to maintain a face-to-face event. Even we though in a 1-year delay, which was not possible due to the overlap with other scientific events. These circumstances and uncertainty led to a low number of abstracts received after the submission deadline.The change to a virtual congress encourages people to participate, and the final number of communications is finally similar to previous congresses. This is not the type of congress we thought and planned, however we considered that this was the best format to keep the event. The change, the extended deadline, and the preparation of the virtual platform for the congress explain the delay in reviewing and accepting abstracts and in the preparation of the final program. Again, I would like to apologize for this.

Around 280 abstracts were finally received, which will be organized as oral and poster presentations. You will access oral sessions organized in three virtual rooms through the webpage of the congress where you can also download the definitive program and the abstract book. You will access using your e-mail and password. An advantage of the virtual format is that you will not miss any oral presentation: this will be available for you for 30 days. In any case, we have tried to avoid the overlap between keynotes. After the presentation, queries to authors will be possible by chat under the supervision of the chairman of the session.

For posters, all will be available along the 3 days of congress and you can use the platform for sending questions to the corresponding author that will receive this by e-mail. As for oral presentations, we would try to maintain available for you during a time.

In all the ESA congress it is always very relevant the Field trips. In this edition, we expected to show you relevant and innovative Mediterranean agrosystems. We have not renounced to this, and you will have available three virtual field trips as videos. With these videos, you will get an idea of the use of the reclaimed marshland area of the Guadalquivir Valley (intensive irrigated land, with around 40000 ha of rice), the new intensive tree orchards systems, and new tools for precision agriculture.

Finally, we would like to express our gratitude for your confidence in the celebration of the conference in these difficult times.

Antonio Delgado

On behalf of the Organizing Committee

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- Abdul M. Mouazen, *University of Ghent.*

ing up to 98%. The phytotoxicity of the OMW sludge was eliminated after the treatments obtaining materials that were phytostimulant. Earthworms decreased the water soluble carbon content and increased the microbial abundance in comparison to compost. The inoculum improved the efficiency of both techniques. *In situ* composting and vermicomposting are eco-sustainable and efficient biostrategies to recover OMW sludge as mature and stable product for agricultural applications while solving the problems posed by the evaporation ponds.

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Keywords: Environmental impact, Sustainability, Organic farming, Fertilization.

0257

LONG-TERM EFFECT OF FARMING SYSTEMS ON THE YIELD OF CROP ROTATION AND SOIL NUTRIENT CONTENT

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The effects of organic (manure, cover crop) and mineral fertilisers on total yield, soil phosphorus (P) and potassium (K) dynamics and soil pH changes were studied over 10 years. Five field crops were grown organically and conventionally in rotation. The total yield of five course crop rotation was 24-25% higher in conventionally fertilised treatments than in organic treatments. The higher yielding conventionally fertilised treatments (annual total yield 29.0-29.8 t ha^{-1}) removed 12-18 kg ha^{-1} P and 45-73 kg ha^{-1} K per year, which was respectively 28-35% and 28-40% higher than organic treatments. The soil became more acidic in the conventional system due to the long-term use of mineral fertilisers (pH 5.4-5.9 versus 5.9-6.3). The highest annual uptake of P and K from the soil was by the potato crop, followed by winter wheat. The use of winter cover crops and well composted cattle manure in the organic system did not maintain the levels of P and K in the soil at baseline.

Keywords: total yield, farming system, organic, conventional, manure, cover crop

0261

PHENOTYPING FOR NITROGEN AND PHOSPHORUS EFFICIENCY IN POTATO

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As resources are scarce and the world focuses upon ecological awareness, the demand for organically grown produce is increasing. While organic farming focuses on reducing the use of plant protection products and fertilisers to a sensible minimum, it is aiming to maintain high quality standards and satisfactory yields. The application of fertiliser in organic farming can also be restricted by government regulations, such as the Fertiliser Ordinance in Germany. However, as adequate nutrient supply is essential to growing field crops such as potatoes, organic farming can be challenging. Therefore, not only the improvement of fertilising strategies, but also the selection of nutrient efficient potato varieties plays a major role in tackling the challenges organic farmers are facing today.

In cooperation with the Julius Kuehn Institute - Federal Research Centre for Cultivated Plants (JKI) as well as the Bavarian State Research Center for Agriculture (LfL), the Leibniz Institute for Plant Genetics and Crop Plant Research (IPK) is phenotyping potato genotypes regarding their nutrient use efficiency.

In our project, we will be testing a broad range of potato genotypes and gene bank accessions, preserved in the Gross Luesewitz Potato Collections, for their efficiency of taking up and utilising low amounts of nitrogen (N) and phosphorus (P). Each genotype will be tested with different levels of N and P fertilisation and compared to standard varieties with known efficiencies or inefficiencies in N and P use. On the poster we present first results from different cultivation methods: in addition to traditional pot experiments using sand as substrate, experiments in a greenhouse-based hydroponic system, as well as jar trials conducted in climatic chambers will be compared for their potential to assess N and P use efficiency in potato. Impacts of the different cultivation systems and N and P supply levels on shoot and root development, N and P uptake, as well as leaf flavonoid, polyphenol and chlorophyll contents will be measured.

In subsequent years, all genotypes will be tested via genome-wide association studies to identify reoccurring genetic markers for N and P efficiency. Using the resulting genetic markers, the breeding process could be streamlined and accelerated, enabling potato breeders to supply farmers, and organic farmers in particular, with a wider spectrum of nutrient-efficient potato varieties.

Keywords: Solanum tuberosum, nutrient efficiency, GWAS, hydroponics

0262

EFFECTS OF REGULATED DEFICIT IRRIGATION AND KAOLIN APPLICATION ON NUT AND KERNEL MORPHOLOGY OF TWO ALMOND (PRUNUS DULCIS (MILL.)) VARIETIES.

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The cultivation of almond trees has undergone a great increase in recent years in Mediterranean countries. This is due to the increase in the consumption of almonds and the good profitability of this crop compared to others. On the other hand, climatic changes in Mediterranean systems are already a reality, as evidenced by different scientific studies. The projections are not favorable and provide for a decrease in rainfall and an increase in temperatures, which causes a higher level of water stress in the plants during the crop development. To mitigate the harmful effects caused by water stress, different strategies are being studied in all Mediterranean areas. The aim of this work was to study simultaneously the effect of deficit irrigation and the kaolin application on morphological parameters in nut and kernel of almond (Prunus dulcis (Mill.) D.A. Webb). The experiment was carried out during the year 2019, in an almond orchard with two cultivars (Constantí and Vairo) located in Alfândega da Fé, northeastern Portugal (lat. 41°20'N long. 6°56'W; alt. 550m). Two irrigation strategies were established based on crop evapotranspiration: 100% of the ETc (control) and 100% of the ETc until the hardening time of the shell reducing the irrigation to 35% ETc during fruit filling stage. Within the two irrigation treatments, kaolin was applied to the same number of trees (14) in randomized blocks.

Along the experiment trees water status were evaluated trough predawn leaf water potential measurements. After harvest, almonds were dried for some weeks and one hundred per sample were randomly selected. Biometric parameters of fruits with shell (weight, length, width, thickness) were measured. The fruits were hulled and the same biometric parameters of kernels and kernel yield were measured. Several indexes were calculated: length to width ratio (L/W), length to thickness ratio (L/T), width to thickness ratio (W/L), volume (V). The indices related to form, I1 and I2 were calculated as T/L and W/L, respectively. The leaf water potential results revealed a moderate stress on deficit irrigation trees, but without differences in the application of kaolin. In terms of kernel yield, the reduction of irrigation did not cause a reduction of this parameter. These preliminary results showed that in the regulated irrigation strategy, in which water consumption was significantly reduced, in combination with the kaolin application, there were no significant losses in yield or changes in morphological parameters, which can make this strategy a sustainable irrigation strategy for almond orchards.

Keywords: sustainability, deficit irrigation, Prunus dulcis, harvest quality

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0279

SOIL MICROBIAL RESPONSE TO TERMINATION METHOD OF COVER CROPS UNDER TWO IRRIGATION LEVELS

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The termination method of cover crops (CC) in annual rotations may affect the benefits that CC provide relative to soil health. The roller crimper is an emerging termination technique, which may be used alone or combined with glyphosate in certain circumstances. It is still unclear the effect of roller crimper on the soil microbial status by the time the subsequent main crop is seeded and starts growing. To evaluate how termination method impacts on a selection of soil microbiological parameters, a microcosm experiment was established using