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Implementations and Plans on Crop Modelling in Turkey (Tekirdağ Namık Kemal University)

30-31 May 2022, Dobrich / Bulgaria



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Sunflower Experiments

Implemented Processes during April-May 2022



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The following objectives are planned to be achieved by the sunflower model

Target 1. Maximizing efficiency and ensuring a sustainable production with minimum irrigation water

Target 2. To determine the most suitable support irrigation plan for the sunflower plant grown in the region.

Target 3: Determination of the most suitable irrigation scheduling for sunflower

Target 4: To reveal the possibilities of using leaf water potential, transpiration rate and stomatal conductivity measurements for plant-based irrigation scheduling planning.



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Sunflower Experimental Research Area

Plant: Sunflower

Research area: The research field of Tekirdağ Viticulture Research Institute Directorate

Layout: 0.7 x 0.3 m

Water source: Groundwater + storage pool

Total study area: 0.5 decare



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Viticulture Research Institute, located in Tekirdağ Province, was selected for this study, both for sunflower and walnut experimental researches. The research institute is located in the district of Süleymanpaşa in Tekirdağ Province. The height of the research area from the sea is 4 m. The Institute has 979 da of agricultural land in total. The research area is located in the semi-arid climate zone. In the research area, where the annual average temperature is 14.1°C, the hottest months are July and August. The average annual precipitation in the region is 580 mm. The annual average relative humidity is 77%. The research area is at 40°59' north latitude and 27°29' east longitude.

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Sunflower Experiment

The sunflower is a dominant plant in our region and country. Sunflower is typically grown in our region to produce oil. The purpose of this study is to investigate the increase in yield with supplemental irrigation of sunflower grown under rainfed conditions in the region.

Aim: Ensuring rural development and sustainable production under supplementary Irrigation

Target: Maximizing crop yield



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Before beginning the experiments, soil profiles were opened up to 120 cm depth to determine the physical properties and productivity analyses of the research area's soils, and soil samples were taken from 0-30, 30-60, 60-90, and 90-120 cm soil layers, both disturbed and undisturbed. The bulk density of undisturbed soil samples was determined, as were the field capacity, wilting point, and texture class values of disturbed soil samples. Disturbed soil samples were taken from 0-20 and 20-40 cm depths for the productivity analysis of the research area's soils (15.04.2022).



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Soil samples

Initial soil moisture measurements were carried out. Soil samples were taken with a soil auger from the depths of 0-30 cm, 30-60 cm, 60-90 cm, and 90-120 cm. The samples were calculated after drying in the oven. (15.04.2022).



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- **April 27, 2022 - Soil preparation**

In the experimental area, plowing was done prior to planting, and soil preparation was done with a pulling pottinger.

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According to soil fertility analyses, 20 kg of 15-15-15 nitrogen, phosphorus, and potassium fertilizer were applied uniformly to all trial plots prior to planting. A harrow was used to prepare the soil surface for sowing just before sowing. Sunflower was seeded with a seeder in trial plots with 70 cm between rows and 35 cm between rows.

The sunflower (*Helianthus annuus* L.) seeds Pioneer 130 (P64LP130) were used in the study. The variety used is drought tolerant, has a high adaptability to all types of soils, is disease tolerant, and has a rapid emergence and first development from the soil.

• 28.04.2022-Sowing



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13.05.2022- Germination and Emergence

Germination and emergence cases were seen on 13.05.2022



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21.05.2022 - Early vegetative development

(when the plant has few leaves)



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Forthcoming actions

- Parceling plan will be made.
- Irrigation system installation will be done.
- Weeding will be done at regular intervals.
- Soil moisture will be monitored by gravimetric method until harvest time
- Soil moisture will also be monitored with watermark moisture sensors.
- Until the harvest time, plant measurements such as leaf area index, leaf water potential, stomatal resistance will be carried out.
- After harvest and water-yield the relations will be revealed.



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Walnut Experiments

Implemented Processes during
April-May 2022



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Walnut Experiment

- Our aim in the first model, which will be prepared to reduce the effects of climate change, is "Conservation of Water and Soil Resources and maximization of efficiency«

For this purpose, the following objectives are planned to be achieved.

- Target 1. Determination of crop water requirement for walnut trees grown or planned in the region
- Target 2. Determination of the most suitable irrigation scheduling for walnuts in the regional conditions
- Target 3: To reveal the usability of the drip irrigation method, which uses irrigation water most effectively for the protection of water resources, for walnut trees in the region.
- Target 4: To reveal the possibilities of using leaf water potential, transpiration rate and stomatal conductivity measurements for plant-based irrigation time planning.

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Walnut Experimental Research Area

- **Plant:** Walnut
- **Research area:** The research field of Tekirdağ Viticulture Research Institute Directorate
- **Type:** Chandler
- **Age:** Between 7-9
- **Water Source:** Groundwater + storage pool
- **Layout:** 8 x 8m
- **Total study area:** 1.4 ha

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Implemented steps

21-22.01.2022 - Bordeaux slurry application
against fungicide pests
22.03.2022 - Fertilization 23 kg (15-15-15)
nitrogen, phosphorus and potassium
14.04.2021 - Herbicide application
22.04.2021 - Pruning
26.04.2021 - Tillage



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Fortcoming actions

- During the irrigation season, soil moisture will be monitored by gravimetric method before each irrigation application.
- Crop measurements will be carried out before each irrigation.
- Fertilizing
- Kaolin (to prevent sunburn)
- weed removal
- Disease and pest control
- Harvest





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Thank You

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