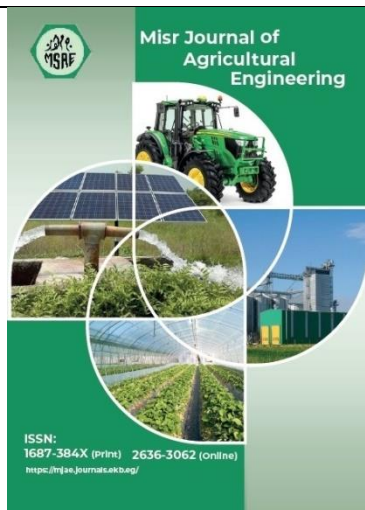


EFFECT OF SCHEDULING IRRIGATION WATER ON PRODUCTION AND WATER USE EFFICIENCY OF SWEET PEPPER YIELD UNDER BASINS SURFACE IRRIGATION SYSTEM

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Keywords:

Scheduling Irrigation; Sweet pepper varieties; Basins Surface Irrigation.

ABSTRACT

During the spring season of 2022–2023, this experiment was conducted in the Government Thamar Special Farm. Three different of scheduling irrigation treatments ((b1) with 100% ETC for four days, (b2) 75% ETC for seven days and (b3) 60% ETC for ten days) were applied to two different species of sweet pepper crop, Yolo Wonder and California Wonder. Based on the data, it was found that the California Wonder cultivar produced the highest value (7.246 cm) for the pepper crop's Length recipe, while the Yolo Wonder cultivar produced the lowest value (6.759 cm). The California Wonder and Yolo Wonder are similar in terms of length, with no discernible variances in the formula. The pepper crop's diameter recipe yielded the maximum value for the California Wonder variety. Additionally, with an average pepper production of 30,070 ton/ha, the California Wonder variety outperformed the Yolo Wonder variety, which yielded a value of 29,710 ton/ha less than the average. The production of the pepper crop is not significantly different between Yolo Wonder and California Wonder. As a result, with an average of 28.362 kg/m³, the California Wonder pepper variety outperformed Yolo Wonder in terms of irrigation water use efficiency for pepper crops. Yolo Wonder's average of 27.988 kg/m³ was the lowest. The production of the pepper crop is not significantly different between Yolo Wonder and California Wonder. When it came to irrigation water use efficiency, the California Wonder pepper variety scored the highest.

INTRODUCTION

Sweet pepper has economic importance and benefits, especially green pepper, which is widely cultivated as follows:

- Vitamin A helps improve eyesight
- Peppers contain flavonoids that protect the body from oxidative damage and diseases, and thus improve immunity.
- Vitamin C is concentrated in large quantities in peppers, especially red ones. It is a water-soluble antioxidant that fights infectious diseases and thus strengthens the immune system.

- Peppers are rich in B vitamins, and they are also rich in vitamin E, which maintains the freshness of the skin and gives health to the hair.
- Peppers help fight cancer, especially breast cancer, due to their high sulfur content.
- The calories in pepper are very low.
- Peppers are rich in fiber, and a great choice for those who follow a diet, because they help burn fat.
- Protects against strokes.
- Peppers are very effective for arthritis patients.
- Pepper gives a feeling of relaxation if eaten regularly for at least 3 months.

Agricultural of sweet pepper in Yemen has an average productivity of 12-15 kg/m². This production is less than global production, which can reach 30 kg/m². (Annual Agricultural Statistics Book - Ministry of Agriculture – YEMEN - 2021)

The research aims to study the impact of irrigation scheduling on:

1- The efficiency and rational use of irrigation water through surface irrigation using the flood irrigation method in basins.

2- The productivity of sweet pepper varieties prevalent in Yemen.

Abdou et al (2011) established that the June 1st sowing and irrigation at 1.2 C.P.E. treatment produced the highest averages of Sunflowers height, head diameter, head weight, seed weight/head, and 100 seed weight in two seasons. The two seasons' lowest results were obtained from July 1st sowing and irrigation at 0.8 C.P.E., while the highest seed yields were recorded at 1050.1 and 1130.4 kg seeds/Fadden. The lowest seed yield/fed was obtained with irrigation at 0.8 C.P.E. and the third planting date (D³). In the two seasons that followed, 560.7 and 596.2 kg seeds/Fadden, respectively, were found from (D¹ I³). In two seasons, ET C averaged 47.76 and 49.86 cm, respectively. With respect to water use efficiency, the highest values were found in 0.470 and 0.486 kg seeds/m³ of water consumed from.

Migliaccio (2018) said that when comparing the nitrogen accumulation in fruit and leaves to the biomass of stems and roots, the impact of irrigation application rate was higher. According to plant performance and water savings, this study finds that a real-time location-specific irrigation scheduler increases irrigation scheduling accuracy in open-field tomato production with sandy soil conditions by matching crop water requirements to actual crop requirements.

Xun Wu et al (2022) The results showed that regulated deficit irrigation (RDI) with a variable threshold combination—where the crop's sensitivity characteristics to water deficit were taken into account at different growth stages—performed better than a constant threshold in terms of increasing crop yield and WUE (water use efficiency). Regardless of the number of irrigation events (1, 2, 3, or 4) during the growing season, the optimized PWDI (plant water deficit index) thresholds' coefficients of variation (CV) were < 0.39 and had a median of 0.21 for different combinations of irrigation sequence and events under the same hydrological year (wet, normal, or dry). It controlled deficit irrigation (RDI), where the sensitivity attributes to, using a variable threshold combination.

Kumawt et al (2017) It was discovered that the highest yield, grain quality parameters, and soil microbial activities were observed when irrigation scheduling was done at 0 kPa or below.

Regarding N application, split N application had a substantial impact on soil microbial activities, yield, and parameters of grain quality. It was discovered that applying more splits and basal application was more successful than applying control.

Pejić et al (2021) According to the study, irrigation began as soon as the plants had fully absorbed the readily accessible water (RAW) in the 0.3 m soil layer. The results of utilizing open water surface (Eo) (42.58 t ha^{-1} , 15.20 kg m^{-3}) and ETo (40.78 t ha^{-1} , 14.56 kg m^{-3}) to calculate crop yield (Y) and irrigation water use efficiency (IWUE) did not show statistical differences. The evapotranspiration rate for the Eo and ETo variants was 364.2 cm and 337.3 cm, respectively. Given the climatic conditions of the Vojvodina region, both techniques can be recommended for irrigation scheduling programs for pepper. This is because the variations in Y and IWUE between the various computations of ETd (daily evapotranspiration of pepper) were not statistically significant. But precedence must be granted.

MOTEVA et al (2016) Demonstrate that every set of data was subjected to an analysis of variance. It was found that sweet corn requires three irrigation treatments and 180 cm net irrigation depth by sprinkling during an extremely dry and warm growth season, and five irrigation applications and 75 cm net irrigation depth by drip irrigation. Better circumstances for the formation of green biomass are produced by drip irrigation, as opposed to sprinkling, which results in 11.4 mg/ha and 62080 pieces, vs 9.5 mg/ha and 57080 pieces under drip irrigation. The yield and its constituent parts were greatly impacted by irrigation. The entire ear fresh yield, marketable ear fresh yield, and single marketable ear fresh yield were all significantly impacted by the irrigation depth.

Zabn et al (2022) That being said, the results showed that there was just one cultivar difference—the height of the wheat plants. Fayyad exhibited a much greater plant height of 80.53 cm in contrast to Bora's 76.53 cm. Treatments without irrigation considerably decreased total chlorophyll as compared to the control.

Tefera et al (2017) Results showed that the highest grain yields, at 140% of the Available Soil Moisture Depletion Level (ASMDL) and 2951 kg/ha, were obtained, respectively, while at 80% ASMDL of two years, the yields were 2598 kg/ha and 2753 kg/ha. Also, at 80% and the FAO-recommended ASMDL, respectively, the maximum water use efficiency of 1.970 kg/m^3 (2011) and 2.103 kg/m^3 (2012) was achieved. Thus, the results gained are useful in raising the productivity of water; however, economic analysis ought to be incorporated for additional guidance.

Patanè et al (2017) Shown that, in addition to saving water, there were improvements to yield and oil quality due to the detrimental effects of water stress on crop productivity and the composition of oil fatty acids. Due to the enhanced economic and environmental sustainability of Mediterranean agricultural techniques, late sowings enable the cultivation of sunflower as a catch crop.

França et al (2024) Application of irrigation water varied from 310 cm (PB1 and PB2) to 786 cm (V1 under SB1) across all irrigation scheduling strategies. Comparing SB1 and SB2 to other irrigation techniques, the net photosynthetic rate (A), transpiration (E), stomatal conductance

(gs), and leaf water potential (LWP) were all higher. Generally speaking, SB1 had a significantly greater grain yield (GY) at 3.5 Mg ha^{-1} compared to 3.0 Mg ha^{-1} in SB2, 2.5 Mg ha^{-1} in CB, 2.4 Mg ha^{-1} in PB1, and 2.0 Mg ha^{-1} in PB2. It was discovered, therefore, that in comparison to the other irrigation treatments, the PB1 treatment led to a noticeably higher IWP (0.84 kg m^{-3}). For soybean crops grown in tropical climates, the selection of irrigation scheduling techniques should generally.

Alhassan et al (2017) In all locations, the results showed that mulched treatment and irrigation intervals of seven days had a substantial ($P > 0.05$) impact on grain yield and water use efficiency. $P < 0.05$ indicated that the major impact of tillage on grain yield and WUE was non-significant. Grain yield and WUE at Mubi and Yola were significantly impacted by the interaction of mulch and irrigation ($P > 0.05$). It was observed that when grain was mulched and irrigation intervals were seven days, the grain yield and WUE were generally greater; when irrigation intervals were twelve days, the values were lower. On the yield and WUE, tillage has minimal effect. Findings from Ganye revealed that overall results were higher than those from Mubi and Yola; additionally, it demonstrated that a 10-day watering interval with mulching could be implemented for.

Afandi et al (2010) As a result, A2 scenario for both crops had a higher yield reduction than B2 scenario. In the event of climate change, a significant fall in wheat and maize yields, with an average decrease of 41% and 56%, respectively, could be anticipated under rotational farming. With irrigation water savings and no yield enhancement under the A2 scenario in both growing seasons, the most successful adaptation approach for wheat was to seed three weeks earlier and to water every 21 days. In the B2 scenario, on the other hand, yield may increase by 8% in the second growing season with less than 1% increase in the applied irrigation water and improved water productivity, while yield could improve by 2% in the first growing season with a 3% drop in the applied irrigation water.

Singh et al (2022) According to the results of the field trial, the 1.0 IW/CPE ratio was shown to be significantly better to all other irrigation schedules in terms of plant characteristics, including growth, yield attribution, and yield traits. Under the irrigation schedule of 1.0 IW/CPE ratio (I2), the considerably maximum grain yield of 2450 kg ha^{-1} and the significantly maximum straw yield of 2842 kg ha^{-1} were recorded. Under the irrigation schedule of 1.0 IW/CPE ratio (I2), the maximum gross monetary return (Rs. 66,248 ha^{-1}), net monetary return (Rs. 34748 ha^{-1}), and benefit cost ratio (1.10:1) were recorded.

Salim et al (2019) According to the findings, the water depth used throughout the quinoa growth season was impacted by irrigation treatments. Notably, the treatment at 1.4 PEF resulted in the greatest seasonal water consumptive usage of $325.5 \text{ cm season}^{-1}$, whereas $302.9 \text{ cm season}^{-1}$ was the lowest amount of water consumed. With seasonal water consumption of 323.0 cm and a potassium fertilization level of 120 kg.ha^{-1} , the 1.2PEF irrigation treatment had the best water use efficiency, measuring 1.63 kg m^{-3} . The highest grain yield was 5.13 tons per hectare. March, April, May, and February had corresponding monthly plant factor (Kc) values of 0.67, 0.41, 0.70, and 0.55, depending on when the 1.2 PEF treatment was administered. Likewise, the outcomes.

Sui et al (2015) The effect of irrigation rate on yield was shown to be substantial in 2013 but not in 2012. For both years, the treatment with the highest watering rate 125 %, Which had the best yield. Because there was enough rainfall in the summer of 2012, there was no discernible yield difference between treatments. There may have been enough rainfall that summer in 2012, which could have contributed to the yield disparity between treatments. For a higher yield, the ET estimates that were utilized in the irrigation scheduling may be less than the actual water need of the corn crops.

MATERIALS AND METHODS

This experiment was carried out at the special Farm in Government Tamar during the spring season of 2022/2023. The physical soil analysis and soil moisture content were obtained the summarized data in table (1).

Table(1): physical soil analysis and soil moisture content of the experimental area.

Physical Soil Analysis				
Sand %	Silt %	Clay %	Textural class	Bulk Density Kg m ⁻³
20.57	48.57	30.86	Loamy clay	1.46
Soil Moisture content				
Field Capacity % volumetric	Wilting Point % volumetric	Available Water % volumetric	Saturation point %	
42.35	17.82	37.65	51.5	

1- Materials:

Surface irrigation was done by using basins, and PVC pipe was utilized to transport water to the field's starting point. In order to keep water from escaping the irrigation basins, it developed a main channel from which it joins sub-main channels and supplies the agricultural basins. The irrigation basins' length is 10 meters, their width is 10 meters, and the experimental plots' area is 100 meters square. Utilize two varieties of sweet pepper crops: Yolo Wonder and California Wonder.

The sweet pepper crop was weighed by using a digital scale, and its length and diameter were measured with a digital caliper.

The evapotranspiration pan from the nearby meteorological station was used to calculate the quantities of irrigation water.

The diameter of the pipes carrying water from the well pump is 3 inches. The irrigation hole is controlled by a valve to discharge 200 liters/minute, and the pump discharges 600 liters/minute. The pump is solar-powered.

1 - The Experimental Design

A randomized complete block design was used, where two varieties of sweet pepper crop (Yolo Wonder and California Wonder) were the placed on the main plots and the three scheduling irrigation treatments ((b1) 4 days (Etc 100%), (b2) 7days (Etc 75%) and (b3)10 days (ETc 60%)) were placed on the sub-main plots. The experimental area is 1000 m² (40*25 m) and the area of each plot is 100 m². as shown in Figs, (1,2).

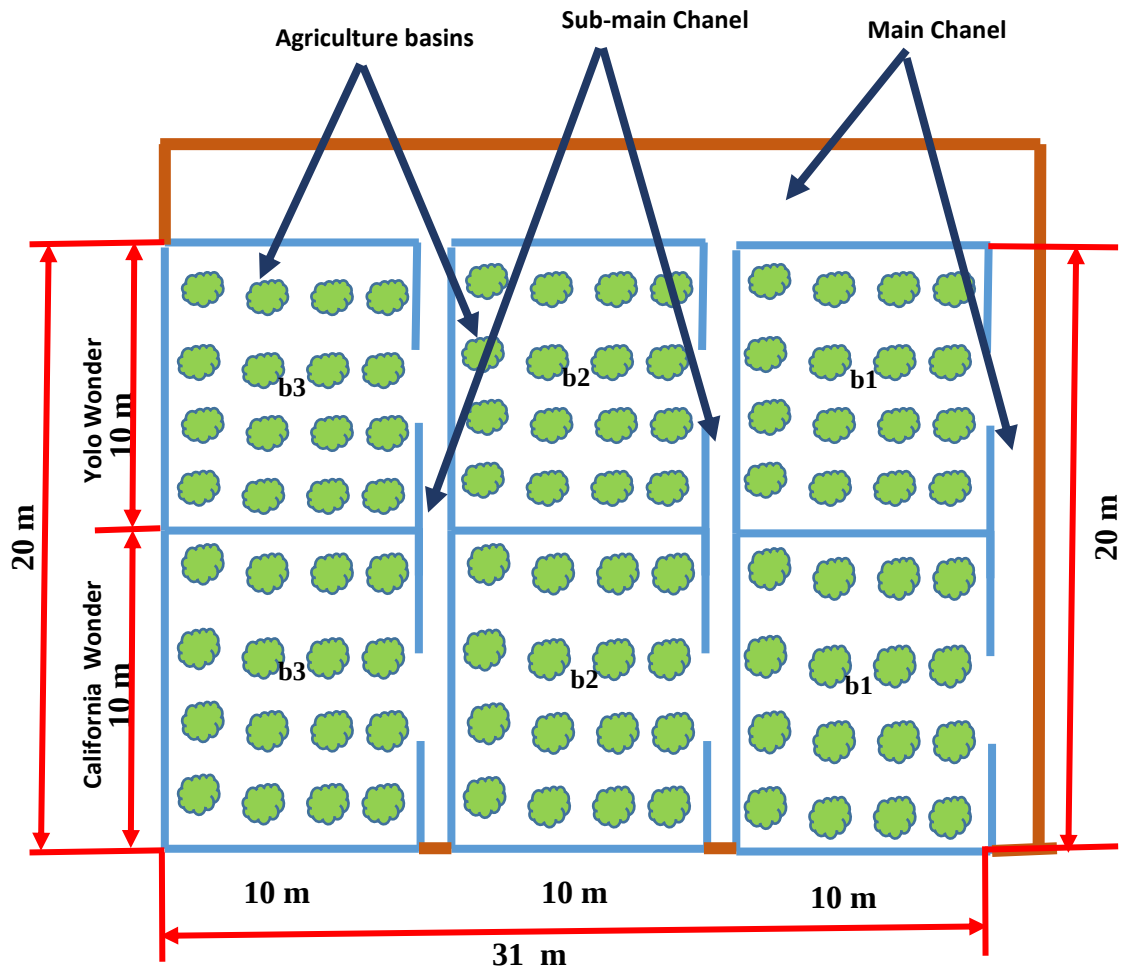


Fig.(1) planning of Experimental treatments distribution

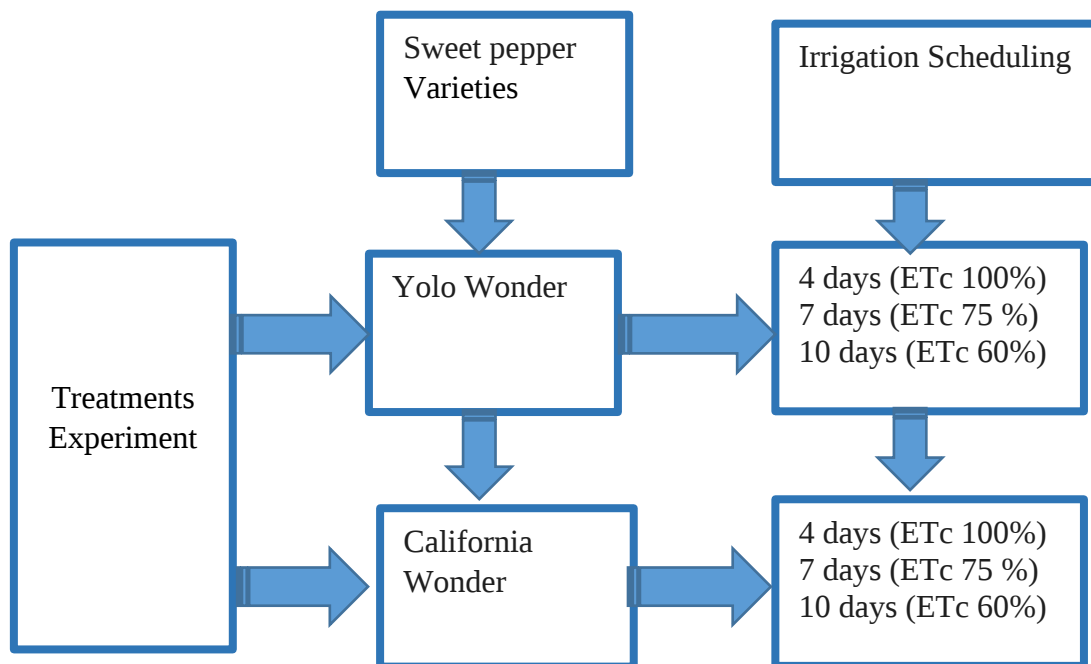


Fig.(2) Planning of Experimental Treatments

2- Amount of Water Application per each Irrigation

Before each irrigation for each treatment, the amount of water which used for irrigation was calculated. An evapotranspiration pan is used from the meteorological station near the research experiment, and the amounts of water evaporated from the basin are calculated to compensate for the lack of moisture in the soil to reach the field capacity in the treatment (ETc100%) water needs of the crop, and twenty-one percent (21%) of water is added. Calculated as water washing salts out of the root zone. The irrigation water treatment was calculated at irrigation scheduling 4 days (ETc100%) with leaching requirements (LR 21%), and from this the reduction was calculated for irrigation scheduling treatments of 7 days (ETc75%) and 10 days (ETc60%). Moisture measurements were taken at the root zone of the sweet pepper crop at an effective depth of 50 cm.

The following formula was used to determine the depth of water to use for each irrigation:

$$\text{Water Depth} = (ETp \times Kp) \times \text{Area of Experimental}$$

where

ETp Evapotranspiration of pan, cm/day.

Kp pan Coefficient.

The interval between successive irrigations was four days. The full irrigation treatment 100% (4 days) was equivalent of ETc of Sweet pepper crop. The deficit irrigation treatments 7 days (75%) and 10 days (60%) were 75 and 60 % from the full irrigation (ETc 100%).

3- Production of Sweet pepper

The total Tomato produced per hectare was calculated as following:

$$\text{pepper Production (Kg/ha)} = \frac{\text{pepper yield (kg)} \times 10000}{\text{sample area (m}^2\text{)}}$$

4- Water Use Efficiency (WUE)

The water productivity of Sweet pepper yield was calculated as following:

$$\text{WUE (kg/m}^3\text{)} = \frac{\text{Sweet pepper yield (kg/ha)}}{\text{water applied (m}^3\text{/ha)}}$$

RESULTS AND DISCUSSION

Table (2) showed that, the California Wonder cultivar gave the highest value of Length, with an average of 7.246 cm, compared to the Yolo Wonder cultivar, which gave the lowest value with an average of 6.759 cm. There are no significant differences between the California Wonder and the Yolo Wonder in the recipe of length.

Table (2) also showed that, the 4-day irrigation schedule gave the highest value in the length characteristic of the pepper crop with an average of 7.773 cm, while the 10-day irrigation schedule gave the lowest value with an average of 5.933 cm. There were significant differences in the length recipe between the different irrigation scheduling treatments for the pepper crop, 1.0220, at a significance level of $P < 0.05$.

Table (2) also showed that, the interactions between the scheduling irrigation treatments and the pepper varieties in the length recipe of the pepper crop were the highest value between the

4-day irrigation scheduling treatment and the California Wonder variety, with an average of 8.377 cm, while the lowest value was between the 10-day irrigation scheduling treatment and the California Wonder variety, with an average of 5.710 cm. There are no significant differences in the interactions between the different irrigation schedules and the pepper varieties.

Table (2): Length of Sweet pepper Yield (cm) as affected by Scheduling Irrigation Water and Sweet pepper Varieties under Surface Basins Irrigation System

Sweet pepper Varieties	Scheduling Irrigation Water			Mean
	4 Days (ETc 100%)	7 Days (ETc 75%)	10 Days (ETc 60%)	
California Wonder	8.377	7.650	5.710	7.246
Yolo Wonder	7.170	6.950	6.157	6.759
Mean	7.773	7.300	5.933	7.003

Table (3) showed that, the California Wonder variety gave the highest value of diameter, with an average of 4.024 cm, compared to the Yolo Wonder variety, which gave the lowest value with an average of 3.873 cm. There are no significant differences between the California Wonder and the Yolo Wonder in diameter

showed that, with Yolo Wonder variety the 4-day irrigation schedule gave the highest value in the diameter characteristic of the pepper crop with an average of 4.277 cm, while the 10-day irrigation schedule gave the lowest value with an average of 3.140 cm. There were significant differences in the diameter characteristic between the different irrigation scheduling treatments for the pepper crop, 0.3212, at a significance level of $P < 0.05$.

The table also showed that the interactions between the irrigation scheduling treatments and the pepper varieties in the diameter characteristic of the pepper crop were the highest value between the 4-day irrigation scheduling treatment and the California Wonder variety, with an average of 4.783 cm, while the lowest value was between the 10-day irrigation scheduling treatment and the Yolo Wonder variety, with an average of 3.140 cm. There are no significant differences in the interactions between the different irrigation schedules and the pepper varieties.

Table (3): Diameter of Sweet pepper Yield (cm) as affected by Scheduling Irrigation Water and Sweet pepper varieties under Surface Basins Irrigation System

Sweet pepper Varieties	Scheduling Irrigation Water			Mean
	4 Days (ETc 100%)	7 Days (ETc 75%)	10 Days (ETc 60%)	
California Wonder	4.783	4.017	3.233	4.024
Yolo Wonder	4.277	4.203	3.140	3.873
Mean	4.530	4.125	3.187	3.949

Table (4) showed that, the California Wonder variety gave the highest value for the pepper yield, with an average of 30,070 tons/ha, compared to the Yolo Wonder variety, which gave a value lower than the average, 29,710 tons/ha. There are no significant differences between California Wonder and Yolo Wonder in pepper crop productivity.

The table also showed that the 4-day irrigation schedule gave the highest value for sweet pepper crop productivity, with an average of 33,643 tons/ha, while the 10-day irrigation schedule gave the lowest value for crop productivity, with an average of 26,456 tons/ha. There were significant differences in productivity between the different irrigation scheduling treatments for the pepper crop, 0.8955, at a significance level of $P < 0.05$.

The table also showed that, the interactions between the irrigation scheduling treatments and the pepper production varieties for the pepper crop were highest in value between the 4-day irrigation scheduling treatment and the Yolo Wonder variety, with an average of 33.739 tons/ha, while the lowest value was between the 10-day irrigation scheduling treatment and the Yolo Wonder variety, with an average of 26.349 tons/ha. There are no significant differences in the interactions between the different irrigation schedules and the pepper varieties.

Table (4): Production Yield of Bell Pepper (ton/ha) as affected by Scheduling Irrigation and Bell Pepper Species under Basins Irrigation System

Sweet pepper Varieties	Scheduling Irrigation Water			Mean
	4 Days (ETc 100%)	7 Days (ETc 75%)	10 Days (ETc 60%)	
California Wonder	33.548	30.100	26.563	30.070
Yolo Wonder	33.739	29.044	26.349	29.710
Mean	33.643	29.572	26.456	29.890

Table (5) shows that the pepper variety of California Wonder gave the highest value for irrigation water use efficiency for the pepper crop with an average of 28.362 kg/m³, compared to the pepper variety of Yolo Wonder which gave the lowest value with an average of 27.988 kg/m³. There are no significant differences between California Wonder and Yolo Wonder in pepper crop productivity.

The table also shows that the 7-day irrigation schedule gave the highest value for the efficiency of irrigation water use for the pepper crop, with an average of 28,700 kg/m³, while the 4-day irrigation schedule gave the lowest value for the efficiency of irrigation water use for the pepper crop, with an average of 27,592 kg/m³. There are no significant differences in productivity between the different irrigation scheduling treatments for the efficiency of using irrigation water for the pepper crop.

Table (5): Water Use Efficiency of Sweet pepper Yield (Kg/m³) as affected by Scheduling Irrigation Water and Sweet pepper Varieties under Surface Basins Irrigation System

Sweet pepper Varieties	Scheduling Irrigation Water			Mean
	4 Days (ETc 100%)	7 Days (ETc 75%)	10 Days (ETc 60%)	
California Wonder	27.522	29.213	28.350	28.362
Yolo Wonder	27.662	28.186	28.117	27.988
Mean	27.592	28.700	28.233	28.175

The table also showed that the interactions between irrigation scheduling treatments and pepper varieties for the efficiency of irrigation water use for the pepper crop was the highest value between the 7-day irrigation scheduling treatment and the California Wonder variety, with an

average of 29.213 kg/m³, while the lowest value for irrigation water use efficiency was between the 4-day irrigation scheduling treatment and the variety. California Wonder with an average of 27,522 kg/m³. There are no significant differences in the interactions between the different irrigation schedules and the pepper varieties.

Table (6) showed that, scheduling irrigation treatments for the two varieties of pepper crop (California Wonder and Yolo Wonder) were the highest amount of irrigation water in the 4 Days treatment, which represents the needs of the pepper crop (ET_c, 100%) , with an average of 1,430 m³/ha, compared to, the two treatments of Irrigation scheduling (7 Days and 10 Days), which represent part of the needs of the pepper crop (deficient irrigation) (ET_c, 75% and ET_c, 60%) respectively, with an average of 1,056 and 88,700 m³/ha. There were significant differences between the different irrigation scheduling treatments for the pepper crop 132.7885 at a significance level of P < 0.005.

Table (6): Scheduling Irrigation of Bell Pepper Yield (m³/ha) as affected by Scheduling Irrigation and Bell Pepper Species under Basins Irrigation System

Sweet pepper Varieties	Scheduling Irrigation Water			Mean
	4 Days	7 Days	10 Days	
	(ET _c 100%)	(ET _c 75%)	(ET _c 60%)	
California Wonder	1430	1056	886.700	1124.233
Yolo Wonder	1430	1056	886.700	1124.233
Mean	1430	1056	886.700	1124.233

Table (7) and Fig. (3,4) showed that, the relationship between the amounts of irrigation water used in the different irrigation scheduling treatments and the productivity of each treatment of the pepper crop. We note that, the 4 Days treatment, which represents (ET_c, 100%), gave the pepper crop productivity 33.643 tons. /ha, with an average irrigation water of 1430 m³ /ha, while the two treatments (7 Days and 10 Days), which represent part of the needs of the pepper crop (deficient irrigation) (ET_c, 75% and ET_c, 60%), gave productivity for the pepper crop of 29,522 and 26,456 tons. /ha, respectively, with an average irrigation water of 1056 and 886,700 m³ /ha, respectively. The productivity of the two treatments (7 Days and 10 Days), which represent part of the needs of the pepper crop (deficient irrigation) (ET_c, 75% and ET_c, 60%), represents 88% and 80%, respectively, compared to, the productivity of the 4 Days treatment, which represents (ET_c, 100%), so They saving the irrigation water of 25% and 40%, respectively, by water scheduling.

Table (7): Compassion between Scheduling Irrigation Water (m³/ha) and sweet pepper Yield (ton/ha) as affected by Scheduling Irrigation Water and Bell Pepper varieties under Surface Basins Irrigation System

Face Compassion	Scheduling Irrigation Water		
	4 Days	7 Days	10 Days
	(ET _c 100%)	(ET _c 75%)	(ET _c 60%)
Scheduling Irrigation Water	1430	1056	886.700
Sweet pepper Yield	33.643	29.522	26.456

Therefore, the productivity of the pepper crop under the schedule (7 Days and 10 Days), which represents part of the needs of the pepper crop (deficient irrigation) (ET_c , 75% and ET_c , 60%) is considered good and acceptable compared to saving irrigation water by 25% and 40% respectively.

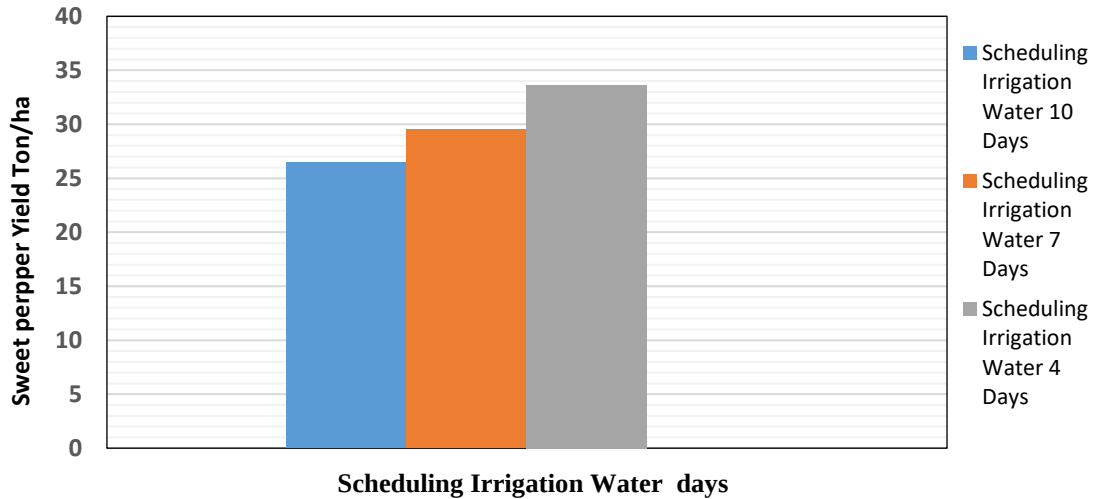


Fig. (3): The relationship between irrigation scheduling treatments and pepper crop productivity.

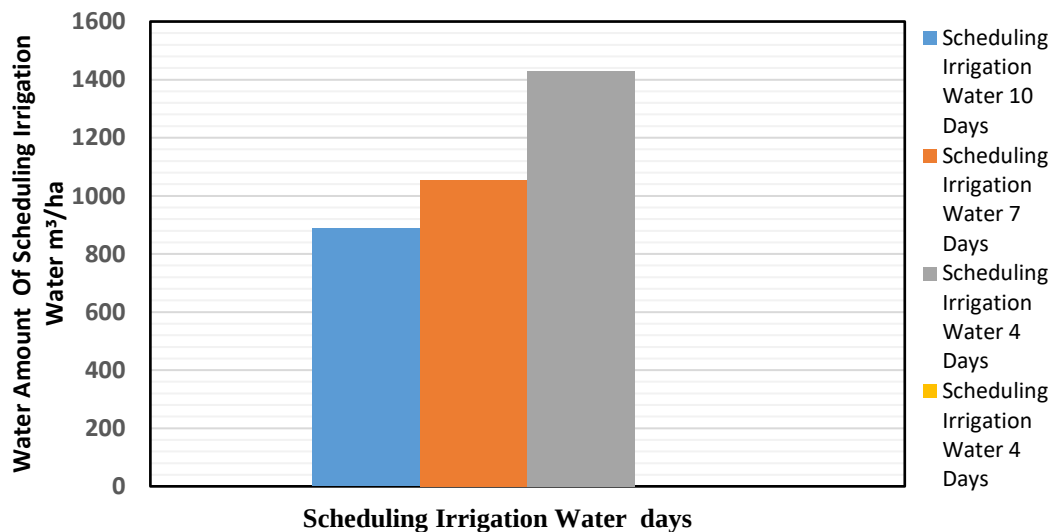


Fig.(4): The relationship between irrigation scheduling treatments and the amounts of irrigation water used in each treatment.

CONCLUSION

The objectives of this study were to evaluate the effect of scheduling irrigation levels and sweet pepper spices on production of pepper crop, water use efficiency and scheduling irrigation under biased surface irrigation. The results of this study showed that:

- 1- Irrigation scheduling strategy is useful to save the irrigation water for the agricultural purposes.

- 2- The scheduling irrigation of 100% of ET_c gave the highest productivity of the bell pepper crop, and the scheduling irrigation of 75% and 60% of ET_c gave the lowest productivity of the bell pepper crop, but in return it saves quantities of irrigation water and reduces energy costs.
- 3- Scheduling irrigation 60% and 75% of ET_c gave the highest water use efficiency, 75% > 60% 'respectively, compared to scheduling irrigation 100% of ET_c.
- 4- Sweet pepper varieties did not give any significant differences in height, diameter, productivity, and irrigation water use efficiency.
- 5- recommended, using modern cultivators such as mulch to reduce weeds and reduce labor costs. As well as using high-yielding sweet pepper varieties from reliable sources of seeds or seedlings.
- 6- Also recommended, introducing modern irrigation systems such as drip to protect irrigation water from being lost in areas outside the root zone, raising crop productivity and better use of agricultural inputs.

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تأثير جدولة الري على الإنتاجية وكفاءة استخدام المياه لمحصول الفلفل الحلو تحت نظام الري بالأحواض السطحي

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الملخص العربي

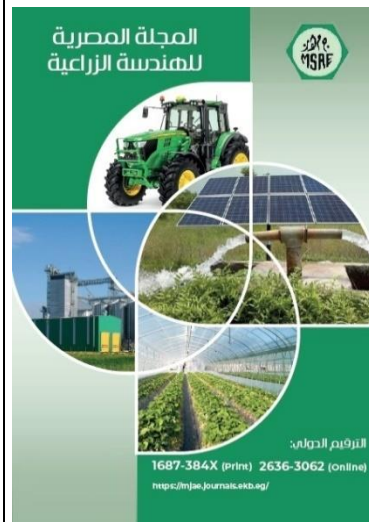
أجريت التجربة خلال ربيع عام ٢٠٢٣م في محافظة دمار، وكانت معاملات التجربة ٣ معاملات جدولة الري (b1) ٤ أيام (ETc %100) و (b2) ٧ أيام (ETc %75) و (b3) ١٠ أيام (ETc %60) ومعاملتي صنف من محصول الفلفل Yolo Wonder و California Wonder.

وأظهرت النتائج أن California Wonder أعطى أعلى إنتاجية قيم طول ثمار الفلفل بمتوسط ٧,٢٤٦ سم، بينما أعطى صنف Yolo Wonder أقل إنتاجية لطول ثمار الفلفل بمتوسط ٦,٧٥٩ سم.

كما أوضحت النتائج أن قطر ثمار الفلفل كانت أعلى في California Wonder بمتوسط ٤,٠٢١ سم، بينما Yolo Wonder الذي أعطى قطر بمتوسط ٣,٨٧٣ سم، وكانت الإنتاجية أعلى في California Wonder بمتوسط ٣٠,٠٧٠ طن/هكتار مقارنة بإنتاجية ٢٩,٧١٠ طن/هكتار Yolo Wonder.

وأظهرت النتائج العلاقة لكميات مياه الري وجدولة الري والإنتاجية لمعاملات محصول الفلفل أن معاملة جدولة الري ٤ أيام (ETc %100) التي تمثل ١٠٠٪ من احتياجات محصول الفلفل أعطت أعلى قيم إنتاجية بمتوسط ٣٣,٦٤٣ طن/هكتار مع متوسط كمية مياه الري ١٤٣٠ متر^٣/هكتار، بينما أعطت معاملتي جدولة مياه الري ١٠,٧ أيام ري واللاتي تمثلان ٧٥٪ و ٦٠٪ ETc على التوالي من احتياجات محصول الفلفل المائية إنتاجية بمتوسط ٢٩,٥٢٢ و ٢٦,٤٥٦ طن/هكتار على التوالي، مع متوسطات كميات مياه الري ١٠٥٦ و ٨٨٦,٧٠٠ متر^٣/هكتار على التوالي.

حيث وفرت معاملتي جدولة الري ١٠,٧ أيام ري (٧٥٪ و ٦٠٪ ETc) من احتياجات محصول الفلفل المائية كميات مياه ري بنسبة ٢٥٪ و ٤٠٪ من مياه الري مع انخفاض في إنتاجية المحصول بنسبة ١٢,٢٥٪ و ٢١,٣٦٪ على التوالي مقارنة بمعاملة ١٠٠٪ ETc احتياجات مائية لمحصول الفلفل.



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الكلمات المفتاحية:

جدولة الري؛ أصناف الفلفل الحلو؛ كفاءة استخدام المياه.