

RESPONSE OF FOUR TENDRAL MELON ACCESSIONS TO DIFFERENT IRRIGATION SCHEDULING

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The recovery of traditional vegetables varieties is increasing in Castilla-La Mancha (Spain), in order to improve particular products maintaining high quality standards. The aim of this work was to determine the effect of different watering treatments on yield and fruit quality of four accessions of Tendral melon

Methods

Localization

Ciudad Real (Spain)

3°56' W, 39°0' N, altitude 640 m

Crop

Cucumis melo L. cv. Tendral

Planting date: 29th May 2005

Transparent plastic mulch

Plant spacing: 2 x 2 m (TR1)

1.5 x 1.5 m (TR2, TR3, TR4)

Fertilization: worm humus (200 g m⁻¹)

120 kg P₂O₅ ha⁻¹

Growth cycle: 102 days

Experimental design

Split-plot with four replications

Main factor of variation: Irrigation

TR1: unirrigated

TR2: 50% ETc weekly

TR3: 50% ETc daily

TR4: 100% ETc weekly

Secondary factor: Accessions

CH11

CH26

CH53

CH60



Results

Factor	Treatment	Marketable yield (t ha ⁻¹)	Fruit number m ⁻²	Fruit weight (kg)
Irrigation (I)	TR1	4.35 a	0.29 a	1.48 a
	TR2	29.94 b	1.28 b	2.35 b
	TR3	32.29 b	1.28 b	2.51 bc
	TR4	30.55 b	1.15 b	2.68 c
Accessions (A)	CH11	26.20 b	0.97 ab	2.51 a
	CH26	25.27 b	1.06 a	2.20 b
	CH53	20.72 a	0.89 b	2.13 b
	CH60	23.96 b	1.00 ab	2.21 b
Interaction	I x A	NS	NS	NS

Values followed by the same letter are not significantly different at (p≤0.05). NS: Not significant

	Treatment	Fruit length (cm)	Fruit width (cm)	Flesh firmness (kg)	Flesh thickness (cm)	Skin thickness (cm)	Placenta weight (kg)	°Brix	pH
Irrigation (% ETc) (I)	TR1	15.74 a	12.84 a	2.95 a	3.39 a	0.75 a	0.14 a	11.00 a	5.59 a
	TR2	19.47 b	15.13 b	2.54 a	4.16 b	0.83 a	0.16 b	13.01 b	5.76 a
	TR3	19.49 b	15.76 b	2.49 a	4.18 b	0.88 a	0.17 c	12.96 b	5.77 a
	TR4	19.59 b	15.87 b	2.67 a	4.39 b	0.79 a	0.17 c	12.77 b	5.72 a
Accessions (A)	CH11	19.67 a	15.45 a	2.88 a	4.22 a	0.84 c	0.17 a	12.27 a	5.60 a
	CH26	18.25 b	14.52 b	2.51 b	3.86 b	0.75 a	0.15 b	12.49 a	5.81 b
	CH53	17.94 b	14.72 b	2.51 b	3.93 b	0.87 c	0.17 a	12.21 a	5.59 a
	CH60	18.24 b	14.93 b	2.71 a	4.08 ab	0.80 b	0.15 b	12.47 a	5.78 b
Interaction	I x A	NS	NS	NS	NS	NS	NS	NS	NS

Values followed by the same letter are not significantly different at (p≤0.05). NS: Not significant

Conclusions



- Tendral melon yield decreased considerably without irrigation, limiting his viability in Castilla-La Mancha
- When the amount of water applied was 50% ETc, maximum yields were obtained without diminishing the fruit quality, whereas higher applications of water (100% ETc) had no effect on Tendral melon yield
- The Tendral accessions more productive were CH11 and CH26

EFFECT OF NITROGEN AND IRRIGATION ON YIELD AND QUALITY OF MELON (*Cucumis melo* L. cv. Sancho)

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Melon is the most important horticultural crop in Ciudad Real (Spain) with around 15000 ha, which are mostly located over aquifer no. 23 with high risk of pollution by nitrates. The objective of this work was to evaluate the effects of irrigation and N fertilizer rates on yield and quality of melon, and to determine the possible interaction between irrigation and nitrogen

METHODS

LOCALIZATION

Ciudad Real (Spain)

3°56' W, 39°0' N, altitude 640 m

CROP

Cucumis melo L. cv. Sancho

Planting date: 26th May 2005

Transparent plastic mulch

Plant spacing: 1.5 x 1.5 m

Elemental plot: 126 m²

Drip irrigation

Emitters: 2 lh⁻¹ (1.5 x 0.5 m)

Growth cycle: 117 days (26/V–20/IX)



EXPERIMENTAL DESIGN

Split-plot with four replications

Main factor of variation: Irrigation (% ETc)

TR1 = 75

TR2 = 100

TR3 = 125

Secondary factor: Nitrogen (kg ha⁻¹)

A0 = 30

A1 = 84

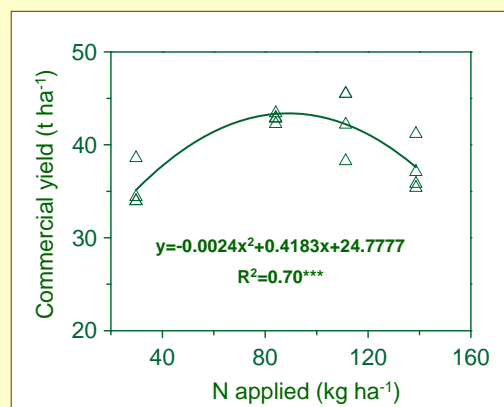
A2 = 111

A3 = 138

RESULTS

Factor	Treatment	Marketable yield (t ha ⁻¹)	Fruit number m ⁻²	Fruit weight (kg)	Efficiency (kg m ⁻³)
Irrigation	TR1	37.81 a	1.17 a	3.24 a	10.77 a
	TR2	39.42 a	1.15 a	3.42 b	8.47 b
	TR3	41.49 a	1.18 a	3.50 b	7.27 c
Nitrogen	A0	35.21 a	1.08 a	3.26 a	7.94 a
	A1	42.86 b	1.27 b	3.39 b	9.59 b
	A2	42.86 b	1.26 b	3.42 b	9.46 b
	A3	37.36 a	1.07 a	3.49 b	8.31 a
Interaction	I X N	N.S.	N.S.	N.S.	N.S.

Values followed by the same letter are not significantly different at p≤0.05. N.S.: not significant



N response curve of melon yield. *** significant at p≤0.001

Factor	Treatment	Fruit length (cm)	Fruit width (cm)	Flesh firmness (kg)	Flesh ratio	Skin thickness (cm)	Placenta weight (kg)	° Brix	pH
Irrigation	TR1	23.80 a	15.94 a	2.23 a	0.65 a	0.60 a	0.19 a	11.71 a	5.63 a
	TR2	24.17 a	16.09 a	2.24 a	0.63 a	0.64 a	0.18 a	11.37 a	5.57 a
	TR3	24.00 a	16.19 a	2.30 a	0.66 a	0.60 a	0.18 a	11.44 a	5.65 a
Nitrogen	A0	23.36 a	15.75 a	2.27 a	0.67 a	0.59 a	0.17 a	11.63 a	5.64 a
	A1	23.83 ab	16.03 a	2.26 a	0.65 a	0.61 a	0.18 b	11.47 a	5.64 a
	A2	24.20 ab	16.24 a	2.21 a	0.65 a	0.62 a	0.19 c	11.50 a	5.62 a
	A3	24.55 b	16.28 a	2.29 a	0.62 b	0.63 a	0.19 c	11.42 a	5.55 a
Interaction	I X N	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.

Values followed by the same letter are not significantly different at p≤0.05. N.S.: not significant

CONCLUSIONS

- ❖ The maximum water use efficiency is obtained with 75% ETc
- ❖ The maximum commercial yield is obtained with 87 kg ha⁻¹ N
- ❖ Nitrogen increases the fruit weight, but at the same time the flesh ratio decreases which means an inferior quality because the edible part diminishes.



EFFECT OF DIFFERENT NITROGEN LEVELS ON DRY MATTER ACCUMULATION AND PARTITIONING IN MELON (*Cucumis melo* L. cv. Sancho)



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The aim of this work was to determine the effects of different N fertilizer rates on the growth, dry matter production and distribution between the vegetative parts and fruits of melon

Methods

Localization

Ciudad Real (Spain)
3°56' W, 39°0' N, altitude 640 m

Experimental design

Random blocks
Four replications
Four N treatments: 30, 84, 111 and 138 kg ha⁻¹

Crop

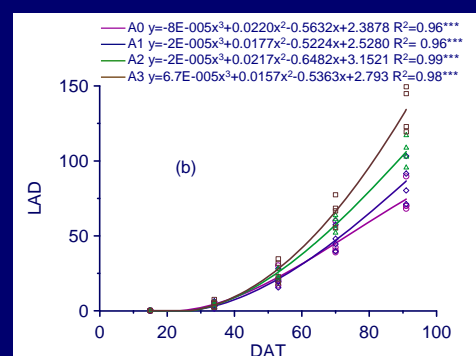
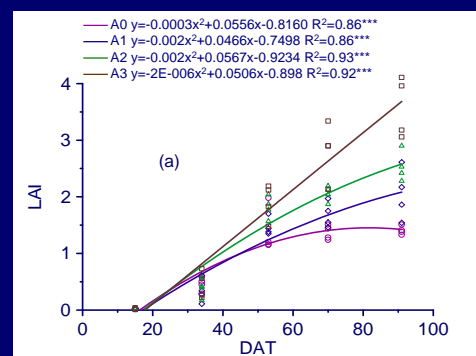
Melon (*Cucumis melo* L.) cv. Sancho
Planting date: 26st May 2005
Transparent plastic mulch
Drip irrigation
Plant spacing: 1.5 x 1.5 m
Fertilization: 120 kg P₂O₅ ha⁻¹
Sampling date: 15, 34, 53, 70 and 91 DAT



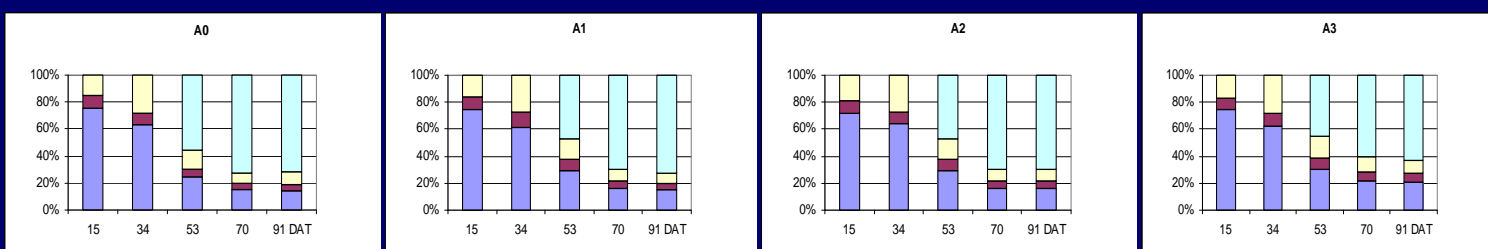
Results

Dry matter	DAT	A0	A1	A2	A3
Leaf (Limb+ Petiole)	15	1.36 a	1.38 a	1.77 a	1.56 a
	34	33.71 a	25.06 a	27.52 a	30.30 a
	53	100.00 a	125.00 ab	149.66 bc	165.55 c
	70	115.66 a	145.91 a	194.34 b	250.34 c
	91	122.04 a	173.46 ab	220.39 b	275.89 c
Stem	15	0.23 a	0.26 a	0.40 a	0.31 a
	34	13.12 a	9.40 a	10.26 a	11.90 a
	53	46.11 a	51.11 a	58.89 a	66.67 a
	70	48.44 a	60.71 ab	76.37 bc	92.40 c
	91	54.35 a	73.06 ab	81.42 b	98.34 c
Fruit	53	181.44 a	158.52 a	189.44 a	194.44 a
	70	426.90 a	480.13 a	613.12 a	531.32 a
	91	455.75 a	640.40 a	702.98 a	647.51 a
Total Plant	15	1.59 a	1.63 a	2.17 a	1.87 a
	34	46.83 a	34.46 a	37.78 a	42.20 a
	53	327.56 a	334.63 a	398.00 a	426.67 a
	70	590.99 a	686.74 a	883.83 b	874.06 b
	91	632.14 a	886.92 b	1004.80 b	1021.74 b

Values followed by the same letter are not significantly different at p≤0.05



LAI (a) and LAD (b) evolution over the growth cycle
*** significant at p≤0.001



Conclusions

- Nitrogen had a pronounced effect on the growth of melon. At the highest level of Nitrogen, dry matter increased continuously due to the progressive increase of vegetative parts
- The highest LAI and LAD values were obtained with 138 kg N ha⁻¹ at 91 DAT
- At 91 DAT, the fruits comprised on average 70% of the total DM produced, which means that they were the strongest sinks for assimilates