# RESULTS & DISCUSSION

## 1- Average leaf area ($cm^2$):

Data presented in Tables (4, 5) showed the effect of different irrigation treatments and polyethylene glycol spraying on average leaf area and percentage of increase of "Canino" apricot trees during 1996 and 1997 seasons.

It is evident that either irrigation treatments or polyethylene glycol treatments affected leaf area at starting date. However, at the end of growing season (October) average leaf area was increased drastically with increasing irrigation level from 0.6 to 1.0. Regarding to polyethylene glycol effect, it could be noticed that treated trees produced leaves with small size than untreated ones. Interaction between the two studied factors showed high significant differences, whereas the highest leaf area was obtained with high irrigation level (1.0) and untreated with polyethylene glycol. On the other hand, the least values of leaf area was obtained in both season from trees irrigated with low irrigation level (0.6) and sprayed with polyethylene glycol at 1%. The percent of leaf area increase was parallel with obtained data in the end of growing season. Where the highest percent of increase in leaf are a (61.1%) was obtained with the trees irrigated with high irrigation level and not treat with PEG. On the other hand, the least value (26.6%) were obtained with 0.6 irrigation level and sprayed with 1% PEG. The same trend of results was also found in the second season of study.

## 2- Average shoot thickness:

Data tabulated in Tables (6, 7) show the effect of different irrigation regimes and spraying polyethylene glycol on average shoot thickness of "Canino" apricot during 1996 and 1997 seasons.

**Table (4): Effect of different irrigation treatments and polyethylene glycol spraying on average leaf area ($cm^3$) and % of increase of "Canino" apricot trees during 1996 seasons.**

| Irrigation treatm. (F)* | Starting (April) | | | | Ending (October) | | | | % of increase | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Control | PEG 1% | PEG 2% | Mean | Control | PEG 1% | PEG 2% | Mean | Control | PEG 1% | PEG 2% | Mean |
| 0.6 | 13.8 $^{a}$ | 13.6 $^{a}$ | 13.5 $^{a}$ | 13.6 $^{A}$ | 21.3 $^{c}$ | 19.3 $^{e}$ | 19.6 $^{e}$ | 20.1 $^{C}$ | 35.2 $^{f}$ | 26.6 $^{f}$ | 31.1 $^{f}$ | 32.0 $^{C}$ |
| 0.8 | 14.2 $^{a}$ | 13.6 $^{a}$ | 14.5 $^{a}$ | 14.1 $^{A}$ | 28.2 $^{c}$ | 25.7 $^{d}$ | 24.5 $^{d}$ | 26.4 $^{B}$ | 49.7 $^{cd}$ | 47.1 $^{d}$ | 40.8 $^{e}$ | 45.9 $^{B}$ |
| 1.0 | 13.9 $^{a}$ | 14.5 $^{a}$ | 13.6 $^{a}$ | 14.0 $^{A}$ | 35.7 $^{a}$ | 30.6 $^{b}$ | 29.7 $^{bc}$ | 32.0 $^{A}$ | 61.1 $^{a}$ | 52.6 $^{bc}$ | 54.2 $^{b}$ | 56.0 $^{A}$ |
| Mean | 13.9 $^{A}$ | 13.9 $^{A}$ | 13.9 $^{A}$ | | 28.4 $^{A}$ | 25.2 $^{B}$ | 24.6 $^{B}$ | | 48.7 $^{B}$ | 43.1 $^{A}$ | 42.0 $^{A}$ | |

* F= The treatment multiplication factor for different irrigation level.

** Mean having the same letter (s) do not differ significantly at the 5% level.

**Table (5): Effect of different irrigation treatments and polyethylene glycol spraying on average leaf area ($cm^3$) and % of increase of "Canino" apricot trees during1997 seasons.**

| Irrigation treatm. (F)* | Starting (April) | | | | Ending (October) | | | | % of increase | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Control | PEG 1% | PEG 2% | Mean | Control | PEG 1% | PEG 2% | Mean | Control | PEG 1% | PEG 2% | Mean |
| 0.6 | 16.9 $^{a}$ | 17.5 $^{a}$ | 16.6 $^{a}$ | 17.0 $^{A}$ | 29.5 $^{de}$ | 26.5 $^{f}$ | 37.6 $^{ef}$ | 27.9 $^{C}$ | 42.7 $^{d}$ | 33.9 $^{e}$ | 39.9 $^{d}$ | 38.8 $^{C}$ |
| 0.8 | 14.0 $^{a}$ | 15.3 $^{a}$ | 16.7 $^{a}$ | 15.3 $^{A}$ | 38.2 $^{b}$ | 31.3 $^{cd}$ | 32.7 $^{c}$ | 34.1 $^{B}$ | 63.4 $^{a}$ | 51.1 $^{c}$ | 48.9 $^{c}$ | 54.5 $^{B}$ |
| 1.0 | 16.3 $^{a}$ | 16.3 $^{a}$ | 14.2 $^{a}$ | 15.6 $^{A}$ | 42.3 $^{a}$ | 38.8 $^{b}$ | 39.5 $^{b}$ | 40.2 $^{A}$ | 61.5 $^{a}$ | 58.0 $^{b}$ | 64.1 $^{a}$ | 61.2 $^{A}$ |
| Mean | 15.7 $^{A}$ | 16.4 $^{A}$ | 15.8 $^{A}$ | | 36.7 $^{A}$ | 32.2 $^{B}$ | 35.3 $^{B}$ | | 55.9 $^{A}$ | 47.7 $^{C}$ | 51.0 $^{B}$ | |

* F= The treatment multiplication factor for different irrigation level.

** Mean having the same letter (s) do not differ significantly at the 5% level.

**Table (6): Effect of different irrigation treatments and polyethylene glycol spraying on average shoot thickness (cm) and % of increase of "Canino" apricot trees during 1996 seasons.**

| Irrigation treatm. (F)* | Starting (April) | | | | Ending (October) | | | | % of increase | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Control | PEG 1% | PEG 2% | Mean | Control | PEG 1% | PEG 2% | Mean | Control | PEG 1% | PEG 2% | Mean |
| 0.6 | 1.39 [a] | 1.35 [a] | 1.36 [a] | 1.37 [A] | 1.93 [d] | 1.90 [d] | 1.92 [d] | 1.92 [B] | 27.9 [b] | 28.9 [b] | 29.2 [b] | 28.7 [C] |
| 0.8 | 1.43 [a] | 1.38 [a] | 1.42 [a] | 1.41 [A] | 2.17 [bcd] | 2.08 [cd] | 2.18 [bcd] | 2.14 [B] | 34.1 [b] | 33.7 [b] | 34.9 [b] | 34.2 [B] |
| 1.0 | 1.38 [a] | 1.39 [a] | 1.40 [a] | 1.39 [A] | 2.38 [abc] | 2.48 [ab] | 2.56 [a] | 2.47 [A] | 42.0 [ab] | 43.2 [a] | 45.3 [a] | 43.5 [A] |
| Mean | 1.4 [A] | 1.37 [A] | 1.39 [A] | | 2.16 [A] | 2.15 [A] | 2.22 [A] | | 34.7 [A] | 35.3 [A] | 36.5 [A] | |

* F= The treatment multiplication factor for different irrigation level.

** Mean having the same letter (s) do not differ significantly at the 5% level.

**Table (7): Effect of different irrigation treatments and polyethylene glycol spraying on average shoot thickness (cm) and % of increase of "Canino" apricot trees during 1997 seasons.**

| Irrigation treatm. (F)* | Starting (April) | | | | Ending (October) | | | | % of increase | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Control | PEG 1% | PEG 2% | Mean | Control | PEG 1% | PEG 2% | Mean | Control | PEG 1% | PEG 2% | Mean |
| 0.6 | 1.88 $^{a}$ | 1.90 $^{a}$ | 1.93 $^{a}$ | 1.90 $^{A}$ | 2.73 $^{bc}$ | 2.68 $^{c}$ | 2.73 $^{bc}$ | 2.71 $^{B}$ | 31.1 $^{bc}$ | 29.1 $^{c}$ | 29.3 $^{c}$ | 29.8 $^{C}$ |
| 0.8 | 1.99 $^{a}$ | 1.90 $^{a}$ | 2.03 $^{a}$ | 1.97 $^{A}$ | 2.90 $^{abc}$ | 2.98 $^{ab}$ | 2.90 $^{abc}$ | 2.93 $^{AB}$ | 31.4 $^{abc}$ | 36.2 $^{ab}$ | 30.0 $^{bc}$ | 32.5 $^{B}$ |
| 1.0 | 1.93 $^{a}$ | 1.88 $^{a}$ | 1.94 $^{a}$ | 1.92 $^{A}$ | 2.98 $^{ab}$ | 3.02 $^{a}$ | 3.00 $^{ab}$ | 3.00 $^{A}$ | 35.2 $^{abc}$ | 37.7 $^{a}$ | 35.3 $^{ab}$ | 36.1 $^{A}$ |
| Mean | 1.93 $^{A}$ | 1.89 $^{A}$ | 1.97 $^{A}$ | | 2.87 $^{A}$ | 2.89 $^{A}$ | 2.88 $^{A}$ | | 32.6 $^{A}$ | 34.3 $^{A}$ | 31.5 $^{A}$ | |

* F= The treatment multiplication factor for different irrigation level.

** Mean having the same letter (s) do not differ significantly at the 5% level.

It is noticed from the two studied seasons data that stem thickness was gradually increased as a result of increase the amount of irrigation water added to apricot trees. However, the effect of anti-transpiration material spraying was negligible in most cases and this phenomena was also declare in the percent of increase. Interaction between the two studied factors showed high significant effects to both factors on stem thickness where the high value (2.56 cm) was obtained with high irrigation level 2% PEG. On contrary, the least value (1.90 cm) was obtained with least irrigation level and 1% PEG.

Data obtained revalued that shoot thickness character is less affect by irrigation level or anti transpiration spraying than other vegetative characters.

The obtained date are in harmony with those obtained by **Ruggiero and Andiloro (1984)** on apricot, **Malik *et al.*, 1994** on apricot and **Maryam 1998** on apples. Additionally, **Landu (1986)** stated that the rate of trunk growth may be used as an indicator of the tree irrigation requirements and it was more sensitive to soil water supply than other parameters.

**3- Average shoot length (cm):**

It is evident from Tables (8, 9) that there was a positive effects to irrigation treatments and polyethylene glycol spraying on average shoot length of "Canino" apricot trees during 1996 and 1997 seasons.

The clear effect to both studied factors were obtained at the end of growing season only where it was noticed that as irrigation level was increased the average shoot length also increased. Poly ethylene glycol at 2% (in the first season only) affected shoot length than other treatments. The percent age of increase data was parallel with the same trend of growing season ending data. Interaction between the two studied factors was significant in most cases. The

**Table (8): Effect of different irrigation treatments and polyethylene glycol spraying on average shoot length (cm) and % of increase of "Canino" apricot trees during 1996 seasons.**

| Irrigation treatm. (F)* | Starting (April) | | | | Ending (October) | | | | % of increase | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Control | PEG 1% | PEG 2% | Mean | Control | PEG 1% | PEG 2% | Mean | Control | PEG 1% | PEG 2% | Mean |
| 0.6 | 18.3 $^{a}$ | 19.6 $^{a}$ | 18.3 $^{a}$ | 18.7 $^{A}$ | 30.2 $^{f}$ | 32.2 $^{ef}$ | 33.8 $^{de}$ | 32.1 $^{C}$ | 39.4 $^{d}$ | 39.1 $^{d}$ | 45.9 $^{c}$ | 41.5 $^{C}$ |
| 0.8 | 17.6 $^{a}$ | 19.7 $^{a}$ | 17.5 $^{a}$ | 18.3 $^{A}$ | 34.8 $^{cde}$ | 35.3 $^{cde}$ | 37.5 $^{bcd}$ | 35.9 $^{B}$ | 49.4 $^{bc}$ | 44.1 $^{cd}$ | 53.3 $^{ab}$ | 48.9 $^{B}$ |
| 1.0 | 18.0 $^{a}$ | 18.3 $^{a}$ | 18.2 $^{a}$ | 18.2 $^{A}$ | 38.9 $^{abc}$ | 40.3 $^{ab}$ | 42.6 $^{a}$ | 40.6 $^{A}$ | 53.7 $^{ab}$ | 54.6 $^{ab}$ | 57.3 $^{a}$ | 55.2 $^{A}$ |
| Mean | 18.0 $^{A}$ | 19.2 $^{A}$ | 18.0 $^{A}$ | | 34.6 $^{B}$ | 35.9 $^{B}$ | 38.0 $^{A}$ | | 47.5 $^{B}$ | 45.9 $^{B}$ | 52.2 $^{A}$ | |

* F= The treatment multiplication factor for different irrigation level.

** Mean having the same letter (s) do not differ significantly at the 5% level.

**Table (9): Effect of different irrigation treatments and polyethylene glycol spraying on average shoot length (cm) and % of increase of "Canino" apricot trees during 1997 seasons.**

| Irrigation treatm. (F)* | Starting (April) | | | | Ending (October) | | | | % of increase | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Control | PEG 1% | PEG 2% | Mean | Control | PEG 1% | PEG 2% | Mean | Control | PEG 1% | PEG 2% | Mean |
| 0.6 | 17.6 $^{a}$ | 18.3 $^{a}$ | 19.3 $^{a}$ | 18.4 $^{A}$ | 29.2 $^{c}$ | 30.2 $^{bc}$ | 31.5 $^{bc}$ | 30.3 $^{C}$ | 39.7 $^{cd}$ | 39.4 $^{cd}$ | 38.7 $^{d}$ | 39.3 $^{C}$ |
| 0.8 | 18.6 $^{a}$ | 18.3 $^{a}$ | 17.5 $^{a}$ | 18.1 $^{A}$ | 33.6 $^{bc}$ | 34.6 $^{b}$ | 34.8 $^{b}$ | 34.3 $^{B}$ | 44.6 $^{bc}$ | 47.1 $^{bc}$ | 49.7 $^{b}$ | 47.1 $^{B}$ |
| 1.0 | 17.6 $^{a}$ | 16.2 $^{a}$ | 18.3 $^{a}$ | 17.4 $^{A}$ | 41.7 $^{a}$ | 42.7 $^{a}$ | 43.6 $^{a}$ | 42.7 $^{A}$ | 57.8 $^{a}$ | 62.1 $^{a}$ | 58.1 $^{a}$ | 59.3 $^{A}$ |
| Mean | 17.9 $^{A**}$ | 17.6 $^{A}$ | 18.4 $^{A}$ | | 34.8 $^{A}$ | 35.8 $^{A}$ | 36.6 $^{A}$ | | 47.4 $^{A}$ | 49.5 $^{A}$ | 48.8 $^{A}$ | |

* F= The treatment multiplication factor for different irrigation level.

** Mean having the same letter (s) do not differ significantly at the 5% level.

same trend of results was also found by **Marangoni *et al.* (1988)** on apricot, **Malik *et al.* (1994)** on apricots and **Maryam (1998)** on apples who found that shoot length was positively affected by the increase of irrigation water added to the trees.

**4- Flowering %, fruit set % and fruit abscission %:**

Data tabulated in Tables (10, 11) show the effect of different irrigation treatments and polyethylene glycol spraying on flowering, fruit set and fruit abscission % of "Canino" apricot during 1996 and 1997 seasons.

Regarding to flowering %, it is clear that no significant differences were detected in the first season either for irrigation treatments or polyethylene glycol treatments. However, in the second season of study an evident reduction of flowering % was noticed with increasing irrigation level. Untreated trees (control) exhibited the highest values of flowering % than polyethylene glycol treated trees. Interaction between the two studied factors was significant in most cases. For instance, (from first season data) the highest flowering % values were obtained with 0.6 irrigation level and 2% polyethylene glycol.

Fruit set % data declare that, as irrigation level was increased fruit set % was decreased in the two studied seasons with high significant differences between different irrigation levels. Meanwhile, no significant differences were obtained between 1% or 2% polyethylene glycol on fruit set % compared with control. Interaction between irrigation treatments and polyethylene glycol was significant in most cases.

Data of fruit abscission % declare that the same effects on fruit set % were also found in fruit abscission %. However, in first season no significant

**Table (10): Effect of different irrigation treatments and polyethylene glycol spraying on flowering %, fruit set % and fruit abscission % of "Canino" apricot trees during 1996 seasons.**

| Irrigation treatm. (F)* | Flowering % | | | | Fruit set % | | | | Fruit abscission % | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Control | PEG 1% | PEG 2% | Mean | Control | PEG 1% | PEG 2% | Mean | Control | PEG 1% | PEG 2% | Mean |
| 0.6 | 89.8 $^{ab}$ | 92.0 $^{ab}$ | 93.0 $^{a}$ | 91.6 $^{A}$ | 17.2 $^{abc}$ | 18.3 $^{ab}$ | 19.8 $^{a}$ | 18.4 $^{A}$ | 11.6 $^{a}$ | 10.6 $^{ab}$ | 9.5 $^{ab}$ | 10.6 $^{A}$ |
| 0.8 | 88.5 $^{b}$ | 90.7 $^{ab}$ | 89.6 $^{ab}$ | 89.6 $^{A}$ | 16.8 $^{a-d}$ | 15.4 $^{bcd}$ | 16.7 $^{a-d}$ | 16.3 $^{B}$ | 8.2 $^{bc}$ | 7.7 $^{bc}$ | 8.8 $^{abc}$ | 8.2 $^{B}$ |
| 1.0 | 89.6 $^{ab}$ | 90.3 $^{ab}$ | 89.5 $^{ab}$ | 89.8 $^{A}$ | 13.5 $^{d}$ | 14.5 $^{bcd}$ | 15.6 $^{bcd}$ | 14.5 $^{C}$ | 7.8 $^{bc}$ | 6.3 $^{c}$ | 8.2 $^{bc}$ | 7.4 $^{C}$ |
| Mean | 89.3 $^{A}$ | 91.0 $^{A}$ | 90.7 $^{A}$ | | 15.8 $^{B}$ | 16.1 $^{AB}$ | 17.4 $^{A}$ | | 9.2 $^{A}$ | 8.2 $^{A}$ | 8.8 $^{A}$ | |

* F= The treatment multiplication factor for different irrigation level.

** Mean having the same letter (s) do not differ significantly at the 5% level.

**Table (11): Effect of different irrigation treatments and polyethylene glycol spraying on flowering %, fruit set % amd fruit abscission % of "Canino" apricot trees during 1997 seasons.**

| Irrigation treatm. (F)* | Flowering % | | | | Fruit set % | | | | Fruit abscission % | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Control | PEG 1% | PEG 2% | Mean | Control | PEG 1% | PEG 2% | Mean | Control | PEG 1% | PEG 2% | Mean |
| 0.6 | 91.5 $^{a}$ | 87.2 $^{ab}$ | 88.3 $^{ab}$ | 89.0 $^{A}$ | 18.2 $^{a}$ | 17.6 $^{a}$ | 16.5 $^{ab}$ | 17.4 $^{A}$ | 18.7 $^{a}$ | 12.3 $^{b}$ | 11.5 $^{b}$ | 14.2 $^{A}$ |
| 0.8 | 82.4 $^{bc}$ | 73.7 $^{d}$ | 62.6 $^{e}$ | 72.9 $^{C}$ | 11.0 $^{d}$ | 12.5 $^{bcd}$ | 14.4 $^{a-d}$ | 12.6 $^{B}$ | 10.3 $^{b}$ | 11.6 $^{b}$ | 10.5 $^{b}$ | 10.8 $^{B}$ |
| 1.0 | 82.8 $^{bc}$ | 75.6 $^{d}$ | 78.5 $^{cd}$ | 79.0 $^{B}$ | 12.0 $^{cd}$ | 13.2 $^{bcd}$ | 15.3 $^{abc}$ | 13.5 $^{B}$ | 7.2 $^{c}$ | 6.3 $^{c}$ | 6.6 $^{c}$ | 6.7 $^{C}$ |
| Mean | 85.6 $^{A}$ | 78.8 $^{B}$ | 76.5 $^{B}$ | | 13.7 $^{B}$ | 14.4 $^{AB}$ | 15.4 $^{A}$ | | 12.0 $^{A}$ | 10.0 $^{AB}$ | 9.5 $^{B}$ | |

* F= The treatment multiplication factor for different irrigation level.

** Mean having the same letter (s) do not differ significantly at the 5% level.

differences between different polyethylene treatments were noticed. Interaction between the two studied factors was also significant in most cases.

**5- Fruit number/tree, average fruit weight and total yield (kg/tree):**

From tabulated data Tables (12, 13) it could be easily noticed that there were an evident effect to both irrigation levels and polyethylene glycol treatments on previous yield attributes on "Canino" apricot during 1996 and 1997 seasons.

Fruit number / tree was greatly affected with irrigation treatments than polyethylene glycol treatments. As irrigation level was increased, fruit number per tree was decreased in both studied seasons with slight differences between 0.8 and 1.0 level in the second seasons. This finding could be attributed to stress condition under low irrigation level (0.6) which led to more flowering %, more fruit set % and consequently more fruit number per tree. Polyethylene treatments had positive effect on increasing fruit number per tree compared with untreated trees with no significant differences between 1 or 2% concentrations. The same trend of results was also obtained in the second season. Interaction between the two studied factors was significant in most cases.

Average fruit weight data was in an opposite trend to fruit number / tree where as irrigation level increased, average fruit number was also increased with high significant differences between different irrigation treatments. The same finding was also found in polyethylene glycol treatment where both treatments significantly increased average fruit weight than control. The negative correlation between fruit number per tree and average fruit weight could be expected because the great number of fruits led to small fruit weight due to great competition between fruits on water and nutritions. Interaction between the two studied factors was significant in most cases.

**Table (12): Effect of different irrigation treatments and polyethylene glycol spraying on fruit number/tree, average fruit weight and total yield (kg/tree) of "Canino" apricot trees during 1996 seasons.**

| Irrigation treatm. (F)* | Fruit number / tree | | | | Av. Fruit weight (g) | | | | Total yield (kg/tree) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Control | PEG 1% | PEG 2% | Mean | Control | PEG 1% | PEG 2% | Mean | Control | PEG 1% | PEG 2% | Mean |
| 0.6 | 318 $^{ab}$ | 327 $^{ab}$ | 336 $^{a}$ | 327.0 $^{A}$ | 58.9 $^{c}$ | 68.5 $^{c}$ | 70.2 $^{bc}$ | 65.9 $^{C}$ | 18.7 $^{c}$ | 22.40 $^{bc}$ | 23.6 $^{ab}$ | 21.6 $^{C}$ |
| 0.8 | 298 $^{bcd}$ | 302 $^{bc}$ | 301 $^{bc}$ | 300.3 $^{B}$ | 63.2 $^{c}$ | 83.3 $^{a}$ | 85.2 $^{a}$ | 77.2 $^{B}$ | 18.8 $^{c}$ | 25.20 $^{ab}$ | 25.6 $^{ab}$ | 23.2 $^{B}$ |
| 1.0 | 268 $^{d}$ | 286 $^{cd}$ | 299 $^{bc}$ | 284.3 $^{C}$ | 81.8 $^{ab}$ | 90.2 $^{a}$ | 90.6 $^{a}$ | 87.5 $^{A}$ | 21.9 $^{bc}$ | 25.80 $^{ab}$ | 27.1 $^{a}$ | 24.9 $^{A}$ |
| Mean | 294.7 $^{B}$ | 305 $^{A}$ | 312 $^{A}$ | | 68.0 $^{B}$ | 80.7 $^{A}$ | 82.0 $^{A}$ | | 19.8 $^{B}$ | 24.5 $^{A}$ | 25.4 $^{A}$ | |

* F= The treatment multiplication factor for different irrigation level.

** Mean having the same letter (s) do not differ significantly at the 5% level.

**Table (13): Effect of different irrigation treatments and polyethylene glycol spraying on fruit number/tree, average fruit weight and total yield (kg/tree) of "Canino" apricot trees during 1997 seasons.**

| Irrigation treatm. (F)* | Fruit number / tree | | | | Av. Fruit weight (g) | | | | Total yield (kg/tree) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Control | PEG 1% | PEG 2% | Mean | Control | PEG 1% | PEG 2% | Mean | Control | PEG 1% | PEG 2% | Mean |
| 0.6 | 474 $^{ab}$ | 479 $^{a}$ | 470 $^{ab}$ | 474.3 $^{A}$ | 51.7 $^{c}$ | 70.2 $^{b}$ | 73.2 $^{b}$ | 65.0 $^{C}$ | 24.5 $^{d}$ | 33.6 $^{c}$ | 34.4 $^{bc}$ | 30.8 $^{C}$ |
| 0.8 | 430 $^{cd}$ | 438 $^{cd}$ | 451 $^{bc}$ | 439.7 $^{B}$ | 71.8 $^{b}$ | 82.2 $^{ab}$ | 90.0 $^{a}$ | 81.3 $^{B}$ | 30.9 $^{c}$ | 36.0 $^{abc}$ | 40.6 $^{a}$ | 35.8 $^{B}$ |
| 1.0 | 418 $^{d}$ | 432 $^{cd}$ | 426 $^{cd}$ | 425.3 $^{B}$ | 83.2 $^{ab}$ | 91.8 $^{a}$ | 93.2 $^{a}$ | 89.4 $^{A}$ | 34.8 $^{abc}$ | 39.7 $^{ab}$ | 39.7 $^{ab}$ | 38.1 $^{A}$ |
| Mean | 441.7 $^{B}$ | 450.0 $^{A}$ | 449 $^{A}$ | | 68.9 $^{B}$ | 81.4 $^{A}$ | 85.5 $^{A}$ | | 30.1 $^{B}$ | 36.4 $^{A}$ | 38.2 $^{A}$ | |

* F= The treatment multiplication factor for different irrigation level.

** Mean having the same letter (s) do not differ significantly at the 5% level.

Total yield data in both seasons was paralell to average fruit weight data. This finding attributed to that total yield calculated by multiply fruit number by average fruit weight.

**6- Fruit firmness, fruit pulp and shelf-life:**

Data presented in Tables (14, 15) show the effect of different irrigation treatments and polyethylene glycol on fruit firmness, fruit pulp and shelf life of "Canino" apricot during 1996 and 1997 seasons.

No significant effects to both studied factors were detected in both studied seasons on fruit firmness. Slightly differences in fruit firmness were noticed between different treatments. Generally fruit firmness was 8.7 to 9.6 lb/inch$^2$ irrespective of irrigation treatments or polyethylene glycol spraying.

Fruit pulp was also slightly affected by irrigation treatments or polyethylene glycol spraying except first season data which indicated to an evident reduction in fruit pulp with 1% PEG treatment.

Shelf life character in the number of days which can the fruits continuos with good appearance and taste under room temperature degree. As the irrigation level was increased fruit shelf life in days was decreased in both studied seasons due to the high water content of fruits led to a lot of water loss and shrinkage. Polyethylene glycol treatments produced fruits with good shelf-life than untreated ones. Interaction between the two studied factors was significant in most cases.

**Table (14): Effect of different irrigation treatments and polyethylene glycol spraying on fruit firmness, fruit pulp % and shelf life in days of "Canino" apricot trees during 1996 seasons.**

| Irrigation treatm. (F)* | Fruit firmness (lb/inch) | | | | Fruit pulp % | | | | Shelf-life (in days) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Control | PEG 1% | PEG 2% | Mean | Control | PEG 1% | PEG 2% | Mean | Control | PEG 1% | PEG 2% | Mean |
| 0.6 | 9.1 [a] | 9.3 [a] | 9.3 [a] | 9.2 [A] | 95.3 [a] | 92.2 [a] | 95.2 [a] | 94.2 [A] | 4.2 [ab] | 4.2 [ab] | 5.3 [a] | 4.5 [A] |
| 0.8 | 8.7 [a] | 8.3 [a] | 9.3 [a] | 8.7 [A] | 96.2 [a] | 93.3 [a] | 96.6 [a] | 95.4 [A] | 3.8 [b] | 4.2 [ab] | 4.2 [ab] | 4.1 [B] |
| 1.0 | 9.2 [a] | 9.5 [a] | 8.2 [a] | 9.0 [A] | 96.8 [a] | 94.5 [a] | 93.5 [a] | 94.9 [A] | 3.8 [b] | 3.8 [b] | 4.2 [ab] | 4.0 [B] |
| Mean | 9.0 [A] | 9.0 [A] | 8.9 [A] | | 96.1 [A] | 93.3 [B] | 95.1 [A] | | 4.0 [B] | 4.0 [B] | 4.6 [A] | |

* F= The treatment multiplication factor for different irrigation level.

** Mean having the same letter (s) do not differ significantly at the 5% level.

**Table (15): Effect of different irrigation treatments and polyethylene glycol spraying on fruit firmness, fruit pulp % and shelf life in days of "Canino" apricot trees during 1997 seasons.**

| Irrigation treatm. (F)* | Fruit firmness (lb/inch) | | | | Fruit pulp % | | | | Shelf-life (in days) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Control | PEG 1% | PEG 2% | Mean | Control | PEG 1% | PEG 2% | Mean | Control | PEG 1% | PEG 2% | Mean |
| 0.6 | 8.9 $^{a}$ | 9.6 $^{a}$ | 9.3 $^{a}$ | 9.3 $^{A}$ | 92.1 $^{a}$ | 92.2 $^{a}$ | 93.2 $^{a}$ | 92.5 $^{A}$ | 4.0 $^{ab}$ | 4.2 $^{ab}$ | 3.8 $^{ab}$ | 4.0 $^{A}$ |
| 0.8 | 8.9 $^{a}$ | 9.5 $^{a}$ | 8.7 $^{a}$ | 9.0 $^{A}$ | 90.8 $^{a}$ | 91.7 $^{a}$ | 92.3 $^{a}$ | 91.6 $^{A}$ | 3.0 $^{b}$ | 4.2 $^{ab}$ | 5.0 $^{a}$ | 4.0 $^{A}$ |
| 1.0 | 8.7 $^{a}$ | 9.3 $^{a}$ | 8.6 $^{a}$ | 8.9 $^{A}$ | 91.3 $^{a}$ | 93.6 $^{a}$ | 95.3 $^{a}$ | 93.4 $^{A}$ | 2.8 $^{b}$ | 4.2 $^{ab}$ | 3.8 $^{ab}$ | 3.6 $^{B}$ |
| Mean | 8.8 $^{A}$ | 9.5 $^{A}$ | 8.8 $^{A}$ | | 91.4 $^{A}$ | 92.5 $^{A}$ | 93.6 $^{A}$ | | 3.2 $^{B}$ | 4.2 $^{A}$ | 4.2 $^{A}$ | |

* F= The treatment multiplication factor for different irrigation level.

** Mean having the same letter (s) do not differ significantly at the 5% level.

**7- Total soluble solids (T.S.S %), total acidity and L. Ascorbic acid of "Canino" apricot fruits:**

Data tabulated in Tables (16, 17) show the effect of different irrigation treatments and polyethylene glycol spraying on T.S.S%, titratable acidity and L. Ascorbic acid content of Canino apricot fruits during 1996 and 1997 seasons.

Fruit T.S.S content did not affect with polyethylene glycol spraying but greatly affected with irrigation treatments. It is clear that T.S.S content was higher with low irrigation water regime due to high concentration of total soluble solids than higher water regime. However, T.S.S content was reduced with 1% PEG treatment than 2% treatment or control in the second season of study.

Regarding to titratable acidity, no clear effect to irrigation treatment or polyethylene glycol was noticed. The same findings were also obtained with interaction values which means that both factors did not affect fruit acidity of "Canino" fruits.

As it mentioned in titratable acidity, it could be also noticed in L. Ascorbic acid content which slightly or no affected with both factors of study.

Generally, it could be concluded that fruit chemical properties slightly affected with horticulture treatments such as irrigation or spraying with various materials.

**8- Yield (kg/fed.), water use ($m^3$ / fed) and water use efficiency ($kg/m^3$):**

Data tabulated in Tables (18, 19) show clear effect to irrigation treatments and polyethylene glycol spraying on total yield and water use efficiency of "Canino" apricot during 1996 and 1997 seasons.

**Table (16): Effect of different irrigation treatments and polyethylene glycol spraying on T.S.S %, titratable acidity and L. Ascorbic acid content of "Canino" apricot trees during 1996 seasons.**

| Irrigation treatm. (F)* | T.S.S % | | | | Acidity (g/100g fresh we.) | | | | L. Ascorbic acid (mg/100g fw.) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Control | PEG 1% | PEG 2% | Mean | Control | PEG 1% | PEG 2% | Mean | Control | PEG 1% | PEG 2% | Mean |
| 0.6 | 14.0 $^{a}$ | 13.7 $^{a}$ | 14.2 $^{a}$ | 14.0 $^{A}$ | 0.52 $^{a}$ | 0.53 $^{a}$ | 0.57 $^{a}$ | 0.54 $^{A}$ | 16.3 $^{a}$ | 16.3 $^{a}$ | 16.3 $^{a}$ | 17.1 $^{A}$ |
| 0.8 | 13.3 $^{a}$ | 13.8 $^{a}$ | 14.2 $^{a}$ | 13.7 $^{AB}$ | 0.57 $^{a}$ | 0.58 $^{a}$ | 0.61 $^{a}$ | 0.58 $^{A}$ | 17.3 $^{a}$ | 17.3 $^{a}$ | 17.3 $^{a}$ | 17.8 $^{A}$ |
| 1.0 | 13.0 $^{a}$ | 13.8 $^{a}$ | 13.8 $^{a}$ | 13.5 $^{B}$ | 0.51 $^{a}$ | 0.58 $^{a}$ | 0.58 $^{a}$ | 0.55 $^{A}$ | 16.2 $^{a}$ | 16.2 $^{a}$ | 16.8 $^{a}$ | 16.1 $^{A}$ |
| Mean | 13.4 $^{A'}$ | 13.8 $^{A'}$ | 14.0 $^{A'}$ | | 0.53 $^{A'}$ | 0.56 $^{A'}$ | 0.58 $^{A'}$ | | 16.6 $^{A'}$ | 16.2 $^{A'}$ | 16.8 $^{A'}$ | |

* F= The treatment multiplication factor for different irrigation level.

** Mean having the same letter (s) do not differ significantly at the 5% level.

**Table (17): Effect of different irrigation treatments and polyethylene glycol spraying on T.S.S %, titratable acidity and L. Ascorbic acid content of "Canino" apricot trees during 1997 seasons.**

| Irrigation treatm. (F)* | T.S.S % | | | | Acidity (g/100g fresh we.) | | | | L. Ascorbic acid (mg/100g fw.) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Control | PEG 1% | PEG 2% | Mean | Control | PEG 1% | PEG 2% | Mean | Control | PEG 1% | PEG 2% | Mean |
| 0.6 | 15.8 $^{a}$ | 14.2 $^{a}$ | 13.9 $^{a}$ | 14.6 $^{A}$ | 0.42 $^{a}$ | 0.53 $^{a}$ | 0.50 $^{a}$ | 0.48 $^{A}$ | 19.2 $^{a}$ | 20.0 $^{a}$ | 21.0 $^{a}$ | 20.0 $^{A}$ |
| 0.8 | 14.1 $^{a}$ | 13.8 $^{a}$ | 14.0 $^{a}$ | 13.9 $^{B}$ | 0.43 $^{a}$ | 0.48 $^{a}$ | 0.42 $^{a}$ | 0.44 $^{A}$ | 18.8 $^{a}$ | 18.6 $^{a}$ | 19.7 $^{a}$ | 19.0 $^{A}$ |
| 1.0 | 13.0 $^{a}$ | 13.2 $^{a}$ | 14.2 $^{a}$ | 13.4 $^{B}$ | 0.47 $^{a}$ | 0.47 $^{a}$ | 0.43 $^{a}$ | 0.45 $^{A}$ | 18.2 $^{a}$ | 18.8 $^{a}$ | 19.7 $^{a}$ | 18.9 $^{A}$ |
| Mean | 14.3 $^{A}$ | 13.1 $^{B}$ | 14.0 $^{A}$ | | 0.44 $^{A}$ | 0.49 $^{A}$ | 0.45 $^{A}$ | | 18.7 $^{A}$ | 19.1 $^{A}$ | 20.1 $^{A}$ | |

* F= The treatment multiplication factor for different irrigation level.

** Mean having the same letter (s) do not differ significantly at the 5% level.

**Table (18): Effect of different irrigation treatments and polyethylene glycol spraying on water use efficiency (WUE) of "Cannino" apricot trees during 1996 seasons.**

| Irrigation treatm. (F)* | Yield (kg.fed) | | | | WU $m^3$/fed./season | | | | WUE kg/$m^3$ | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Control | PEG 1% | PEG 2% | Mean | Control | PEG 1% | PEG 2% | Mean | Control | PEG 1% | PEG 2% | Mean |
| 0.6 | 3927 $^{d}$ | 4704 $^{bcd}$ | 4956 $^{abc}$ | 4529 $^{C}$ | 929.3 $^{c}$ | 929.3 $^{c}$ | 929.3 $^{c}$ | 929.3 $^{C}$ | 4.23 $^{abc}$ | 5.63 $^{a}$ | 5.33 $^{ab}$ | 5.06 $^{A}$ |
| 0.8 | 3948 $^{d}$ | 5292 $^{abc}$ | 5376 $^{abc}$ | 4872 $^{B}$ | 1239.8 $^{b}$ | 1239.8 $^{b}$ | 1239.8 $^{b}$ | 1239.8 $^{B}$ | 3.18 $^{c}$ | 4.27 $^{abc}$ | 4.31 $^{abc}$ | 3.93 $^{B}$ |
| 1.0 | 4599 $^{c}$ | 5418 $^{ab}$ | 5691 $^{a}$ | 5236 $^{A}$ | 1549.8 $^{a}$ | 1549.8 $^{a}$ | 1544.8 $^{a}$ | 1549.8 $^{A}$ | 2.97 $^{c}$ | 3.50 $^{bc}$ | 3.67 $^{bc}$ | 3.38 $^{B}$ |
| Mean | 4158 $^{C}$ | 4838 $^{B}$ | 5341 $^{A}$ | | 1239.6 $^{A}$ | 1239.6 $^{A}$ | 1239.6 $^{A}$ | | 3.46 $^{B}$ | 4.47 $^{A}$ | 4.45 $^{A}$ | |

* F= The treatment multiplication factor for different irrigation level.

** Mean having the same letter (s) do not differ significantly at the 5% level.

**Table (19): Effect of different irrigation treatments and polyethylene glycol spraying on water use efficiency (WUE) of "Canino" apricot trees during 1997 seasons.**

| Irrigation treatm. (F)* | Yield (kg.tree) | | | | WU $m^3$/fed./season | | | | WUE kg/$m^3$ | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Control | PEG 1% | PEG 2% | Mean | Control | PEG 1% | PEG 2% | Mean | Control | PEG 1% | PEG 2% | Mean |
| 0.6 | 5145 $^{d}$ | 7056 $^{bc}$ | 7224 $^{b}$ | 6475 $^{C}$ | 1227.9 c | 1227.9 $^{c}$ | 1227.9 $^{c}$ | 1227.9 $^{C}$ | 4.19 $^{abc}$ | 5.75 $^{ab}$ | 5.88 $^{a}$ | 5.27 $^{A}$ |
| 0.8 | 6489 $^{c}$ | 7560 $^{b}$ | 8526 $^{a}$ | 7525 $^{B}$ | 1638.6 b | 1638.6 $^{b}$ | 1638.6 $^{b}$ | 1638.6 $^{B}$ | 3.96 $^{c}$ | 4.61 $^{abc}$ | 5.20 $^{abc}$ | 4.59 $^{B}$ |
| 1.0 | 7308 $^{b}$ | 8337 $^{a}$ | 8337 $^{a}$ | 7994 $^{A}$ | 2048.1 a | 2048.1 $^{a}$ | 2048.1 $^{a}$ | 2048.1 $^{A}$ | 3.57 $^{c}$ | 4.07 $^{bc}$ | 4.07 $^{bc}$ | 3.90 $^{C}$ |
| Mean | 6317 $^{C}$ | 7651 $^{B}$ | 8029 $^{A}$ | | 1638.2 A | 1638.2 $^{A}$ | 1638.2 $^{A}$ | | 3.91 $^{B}$ | 4.81 $^{AB}$ | 5.05 $^{A}$ | |

* F= The treatment multiplication factor for different irrigation level.

** Mean having the same letter (s) do not differ significantly at the 5% level.

The obtained data in Tables (12, 13) related to the yield per tree are in harmony with those related to the total yield per feddan. As irrigation water was increased the total yield was increased in a highly significant differences between different irrigation levels. As evident increase in total yield was also obtained with polyethylene glycol treatments with an evident difference between them. The interaction between the two studied factors was also significant in most cases. Water use ($m^3$/fed) was added in 3 levels as it clear from Table (18) i.e. 929.3, 1239.8 and 1549.8$m^3$ / fed/season. Regarding to water use efficiency, it was high with low irrigation level (0.6 level) followed by 0.8 and 1.0 in descending orders. It is means that total yield of "Canino" fruits is not important but it must known the numbers of water cubic meters needed to produce this yield (water use efficiency). So that, it could be irrigated with 0.6 level (stress) or 0.8 (normal) not by 1.0 due to no significant differences between 0.8 or 1.0 levels. Spraying of antitranspiration material (PEG) improved WUE especially under stress conditions (0.6 level) with no significant differences between 1% or 2% concentrate. Interaction between the two studied factors was significant in most case which means that under stress condition (0.6 level) treatment of the trees improved and increased the net yield compared with normal irrigation condition.

**9- Leaf proline content, leaf boron content and leaf chlorophyll content:**

Data tabulated in Tables (20, 21) show the effect of different irrigation treatments and spraying of antitransparent material (PEG) on the leaf content of proline, boron and chlorophyll during 1996 and 1997 seasons.

**Table (20 ): Effect of different irrigation treatments and polyethylene glycol spraying on leaf proline content %, leaf boron content (ppm) and leaf chlorophyll content (mg/l) of "Canino" apricot trees during 1996 seasons.**

| Irrigation treatm. (F)* | Leaf proline content % | | | | Leaf boron content (ppm) | | | | Leaf chlorophyll content (mg/l) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Control | PEG 1% | PEG 2% | Mean | Control | PEG 1% | PEG 2% | Mean | Control | PEG 1% | PEG 2% | Mean |
| 0.6 | 0.416 $^{a}$ | 0.316 $^{ab}$ | 0.302 $^{ab}$ | 0.344 $^{A}$ | 1.387 $^{bcd}$ | 1.332 $^{cd}$ | 1.423 $^{bc}$ | 1.380 $^{B}$ | 6.83 $^{bcd}$ | 8.20 $^{ab}$ | 9.30 $^{a}$ | 8.11 $^{A}$ |
| 0.8 | 0.218 $^{bc}$ | 0.206 $^{bc}$ | 0.200 $^{bc}$ | 0.208 $^{B}$ | 1.692 $^{a}$ | 1.372 $^{bcd}$ | 1.542 $^{ab}$ | 1.500 $^{A}$ | 5.08 $^{cd}$ | 7.23 $^{abc}$ | 7.30 $^{abc}$ | 6.53 $^{B}$ |
| 1.0 | 0.163 $^{c}$ | 0.158 $^{c}$ | 0.150 $^{c}$ | 0.157 $^{C}$ | 1.218 $^{d}$ | 1.432 $^{bc}$ | 1.323 $^{cd}$ | 1.320 $^{B}$ | 4.43 $^{d}$ | 7.70 $^{ab}$ | 6.32 $^{bcd}$ | 6.15 $^{B}$ |
| Mean | 0.265 $^{A}$ | 0.226 $^{A}$ | 0.217 $^{A}$ | | 1.432 $^{A}$ | 1.378 $^{A}$ | 1.429 $^{A}$ | | 5.44 $^{B}$ | 7.71 $^{A}$ | 7.64 $^{A}$ | |

* F= The treatment multiplication factor for different irrigation level.

** Mean having the same letter (s) do not differ significantly at the 5% level.

**Table (21 ): Effect of different irrigation treatments and polyethylene glycol spraying on leaf proline content %, leaf boron content (ppm) and leaf chlorophyll content (mg/l) of "Canino" apricot trees during 1997 seasons.**

| Irrigation treatm. (F)* | Leaf proline content % | | | | Leaf boron content (ppm) | | | | Leaf chlorophyll content (mg/l) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Control | PEG 1% | PEG 2% | Mean | Control | PEG 1% | PEG 2% | Mean | Control | PEG 1% | PEG 2% | Mean |
| 0.6 | 0.439 $^{a}$ | 0.383 $^{ab}$ | 0.362 $^{ab}$ | 0.394 $^{A}$ | 0.923 $^{bc}$ | 1.035 $^{ab}$ | 0.980 $^{abc}$ | 0.979 $^{B}$ | 7.07 $^{bcd}$ | 9.82 $^{a}$ | 9.31 $^{ab}$ | 8.70 $^{A}$ |
| 0.8 | 0.308 $^{bc}$ | 0.300 $^{bcd}$ | 0.289 $^{bcd}$ | 0.299 $^{B}$ | 0.854 $^{c}$ | 1.028 $^{ab}$ | 0.995 $^{abc}$ | 0.959 $^{B}$ | 6.01 $^{cd}$ | 8.21 $^{abc}$ | 7.53 $^{a-d}$ | 7.25 $^{AB}$ |
| 1.0 | 0.137 $^{e}$ | 0.207 $^{cde}$ | 0.190 $^{de}$ | 0.178 $^{C}$ | 1.032 $^{ab}$ | 1.100 $^{a}$ | 1.023 $^{ab}$ | 1.051 $^{A}$ | 5.17 $^{d}$ | 7.72 $^{abc}$ | 7.28 $^{bcd}$ | 6.70 $^{B}$ |
| Mean | 0.294 $^{A}$ | 0.297 $^{A}$ | 0.280 $^{A}$ | | 0.936 $^{A}$ | 1.054 $^{A}$ | 0.999 $^{A}$ | | 6.08 $^{B}$ | 8.58 $^{A}$ | 8.04 $^{A}$ | |

* F= The treatment multiplication factor for different irrigation level.

** Mean having the same letter (s) do not differ significantly at the 5% level.

Great effect of irrigation level was noticed in chemical components of "Canino" apricot trees. Proline content which considered as a tool of water stress conditions was greatly increased with decreasing the amount of added water to the trees. No clear effect to antitransparent material on leaf proline content in both studied seasons.

Regarding to leaf boron content, no clear trend was obtained with different irrigation treatments or spraying polyethylene glycol. Chlorophyll content was reduced with increasing irrigation water regime. Interaction between the two studied factors was significant in most cases.