

## Growth, assimilate partition and yield of melon charenthais under different shading screens

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### ABSTRACT

In this experiment we evaluated the growth, partition of assimilates and yield of melons type hybrid Charenthais 'Fleuron' under different shading nets. The experiment was conducted at Federal University of Viçosa, from November 24, 2003 to March 11, 2004. The treatments consisted of four growth environmental conditions, as follows: control (full sun), and under Aluminet® 30%-O, Cromatinet® 30%-O, Sombrite® 30%, with reduction of photosynthetic active radiation (PAR) of 30.85%, 35.9% and 32.0%, respectively. The experiment was arranged in a complete random design with four replicates. For the periodically evaluated characteristics we used a sub divided parcel 4 x 7 with the growing conditions in the parcel and the evaluations on the sub parcel (0, 14, 28, 42, 56, 70 and 84 days after transplantation). Among the shading nets, overall growth was superior under Aluminet® 30%-O, with similar plant height, length and number of internodes, number of leaves per plant, leaf dry weight, total and commercial yield of fruits and greater leaf area per plant compared to control at full sun. The low number of daily radiation (4.47 hours) and the good growth and yield of the melon when shaded by 30.85% with Aluminet® 30%-O, are indicative that this culture does not require elevated levels of radiation as mentioned before. The growth of melon under partial restriction of light is promising, opening opportunities to production in new environments as agroforestry systems and associated cultivations.

**Keywords:** *Cucumis melo*, light, leaf area, dry weight, yield.

### RESUMO

#### Crescimento, partição de assimilados e produção de frutos de melão charentais sombreado por diferentes malhas

Objetivou-se avaliar o crescimento, a partição de assimilados e a produção de frutos de melão tipo Charentais híbrido 'Fleuron' em cultivos sombreados por diferentes malhas. O experimento foi conduzido na Universidade Federal de Viçosa, no período de 24/11/2003 a 11/03/2004. Os tratamentos foram constituídos de quatro ambientes de cultivo: controle (pleno sol) e sob as malhas Aluminet® 30%-O, Cromatinet® 30%-O e Sombrite® 30%, com reduções na radiação solar fotossinteticamente ativa (RFA) de 30,85%, 35,9% e 32,0%, respectivamente. O delineamento experimental foi inteiramente casualizado, com quatro repetições. Para as características avaliadas periodicamente utilizou-se o esquema de parcela subdividida 4 x 7 com os ambientes alocados nas parcelas e as avaliações periódicas (0, 14, 28, 42, 56, 70 e 84 dias após o transplante) nas subparcelas. Dentre os ambientes sombreados, o cultivo sob Aluminet® 30%-O foi o que mais se destacou por ter apresentado resultados equivalentes ao controle quanto à altura de planta, comprimento e número de entrenós, número de folhas por planta, massa seca de folha e produção total e comercial de frutos e superado esse quanto à área foliar por planta. A baixa insolação média diária (4,47 h) e o bom desempenho em crescimento e produção do meloeiro, quando sombreado em 30,85% pelo Aluminet® 30%-O, são indicativos de que o melão não é uma cultura altamente exigente em luz como se tem apreçoado. O cultivo do meloeiro sob restrição de luz mostrou-se promissor abrindo perspectivas para o cultivo em sistemas agroflorestais ou em cultivos associados.

**Palavras-chave:** *Cucumis melo*, luz, área foliar, massa seca, produtividade.

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Melón (*Cucumis melo* L.) is an herbaceous annual plant that develops well under dry, sunny and hot weather conditions (Fontes & Puiatti, 2005). The physiological processes responsible for growth and yield in any cultivated plant are directly affected by the climatic conditions (Wien, 1997). The solar radiation is the primary source of energy, being responsible for keeping photosynthetic processes. Nevertheless,

the excess of radiation may damage the photosynthetic apparatus, since the efficiency of photosynthesis can be severally reduced when some plants are exposed to elevated levels of radiation, affecting the overall growth and yield (Martinez, 1996). This phenomenon of photosynthesis reduction by the excess radiation is named photo inhibition (Taiz & Zeiger, 2004). Since the solar radiation is fundamental for the crop

growth and yield, such interactions have been object of many researches, with the goal to identify if the intensity and light quality interfere on the morphological and physiological processes.

The melon species require elevated radiation and temperature to grow, affecting photosynthesis, respiration, photorespiration, transpiration and stomatic conductance, factors that are responsible for the suitable growth and

high yields (Nakansah *et al.*, 1996; Silva & Costa, 2003). However, the general believe is that melon requires high temperature and radiation levels; which most of the time, is conditioned to a low cost growth condition, without studies to evaluate the physiological processes under these climatic conditions.

In Cantaloupe and Honey Dew fields, the radiation saturation point usually reaches levels between 1,000 and 1,200  $\mu\text{mol m}^{-2} \text{s}^{-1}$  (Kitroongruang *et al.*, 1992; Valantin *et al.*, 1998); this radiation intensity is well below that of tropical environment, which can reach values above the 1,800  $\mu\text{mol m}^{-2} \text{s}^{-1}$  (Nkansah *et al.*, 1996). Some researches were conducted to determine the effect of shading on the quality of melons (Nishizawa *et al.*, 1998; Nishizawa *et al.*, 2000). However, there exist only scarce publications in which the authors evaluated the effect of shading in order to obtain maximum growth and yield with optimum source/sink ratio.

Related to the watermelon, Nakansah *et al.* (1996) found that the highest yield was obtained with full sun radiation (1,200  $\mu\text{mol m}^{-2} \text{s}^{-1}$  PAR, measured at noon), when compared to 50% shaded condition (600  $\mu\text{mol m}^{-2} \text{s}^{-1}$  PAR, measured at noon). However, the authors concluded that under tropical conditions the radiation can be superior to 1,800  $\mu\text{mol/m/s}$  PAR, which is above the radiation obtained in this experiment, allowing the growth of watermelon in agroforestry systems and associated crops. Calatayud *et al.* (2000), also researching the watermelon, found that the highest yield was obtained under shading conditions at 800  $\mu\text{mol m}^{-2} \text{s}^{-1}$  PAR, measured at noon, when compared to the yield at full sun with 1,800  $\mu\text{mol m}^{-2} \text{s}^{-1}$  PAR, measured also at noon.

This research was conducted to evaluate the variations on the growth of Charenthais melon plants, regarding the biomass accumulation and fruit yield under shaded net conditions.

## MATERIAL AND METHODS

The experiment was set up in field, on the Federal University of Viçosa, Minas Gerais State, from November 24,

2003 to March 11, 2004, using the hybrid melon 'Fleuron', type Charenthais, from the group Cantaloupensis. The crop was grown in a soil classified as Clay Red-Yellow, Câmbico, phase terrace, with clayey texture, with the following chemical characteristics: pH in  $\text{H}_2\text{O}$  (1:2.5)= 5.8; P= 58.5 and K= 76.0  $\text{mg dm}^{-3}$ ; Ca= 4.0; Mg= 0.8; Al= 0.0; H + Al= 6.63; SB= 4.99;  $\text{CTC}_{\text{effective}} = 4.99$ ;  $\text{CTC}_{\text{total}} = 8.62 \text{ cmol}_c \text{ dm}^{-3}$  and OM= 3.33  $\text{dag kg}^{-1}$ . The climatic conditions during the period of the research are presented on Table 1.

The experiment consisted of four treatments as follows: control (full sun) and under shading nets Aluminet® 30%-O, Cromatinet® 30%-O and Sombrite® 30%, reducing the PAR by 30.85%, 35.9% and 32.0%, respectively. The nets were installed in open greenhouses with the dimensions of 2 x 4 x 36 m (height x wide x length). The experiment was arranged in a complete random design with four replicates. Each plant characteristic was evaluated at every 14 days, utilizing a subdivided parcel scheme 4 x 7, where the environmental conditions were considered as parcels and the evaluations at 0, 14, 28, 42, 56, 70 and 84 days after transplanting as sub parcels.

Before transplanting, the soil preparation consisted of plowing, harrowing and open planting furrows spaced 1.0 m apart on beds built to a height of 20 cm and a width of 40 cm. The furrows were fertilized according to the chemical analysis using the recommendations for the melon crop (Silva & Costa, 2003) as follows: 240  $\text{kg ha}^{-1}$  of  $\text{P}_2\text{O}_5$ , 19 of  $\text{K}_2\text{O}$  (10% from the total), 15 of N (10% from the total), 200 of magnesium sulfate, 20 of borax, 15 of zinc sulfate and 3  $\text{kg ha}^{-1}$  of ammonium molybdate. During the crop cycle, plants were fertirrigated with N and K, starting after seven days from transplanting, with a total of 135 kg of N and 171 kg of  $\text{K}_2\text{O ha}^{-1}$  split in ten weekly sections at rates of 5% in the first two weeks and 10% each week until 70 days after transplanting.

Sowing was conducted in a greenhouse, on November 24, in a 128-cell polystyrene tray filled with the commercial substrate Plantmax with

one seed per cell. The plantlets were transplanted with three true leaves at 1.0 x 0.3 m final space. The experimental unit consisted of four 4.5-m long rows, totalling the area of 18  $\text{m}^2$ . The two inside rows were considered useful for the analysis, excluding the external plants. Throughout the whole cycle, the plants were conducted in the vertical position and with one main stem per plant. Weed control, irrigation and disease control were done as recommended by Silva & Costa (2003).

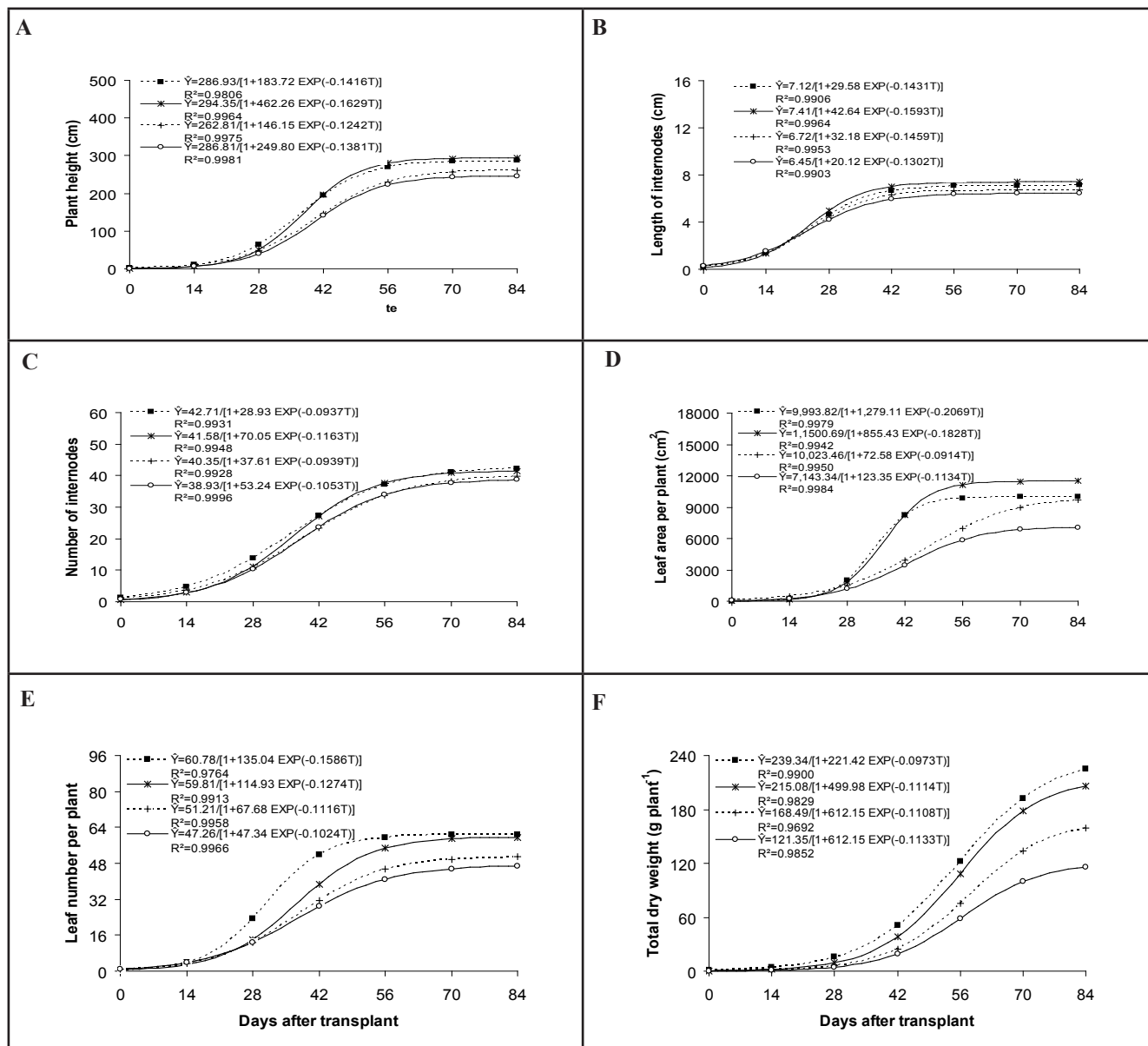
In order to evaluate the growth and assimilate partition, reproductive and vegetative aerial parts of the plants were harvested every 14 days, beginning at transplanting up to 84 days after transplanting (DAT), totalizing four plants composing each treatment. We evaluated the length of the main stem, number and length of internodes, number of leaves per plant, area and dry matter of the leaves and dry matter of stem, roots and fruits. The leaf area was determined using a leaf meter LI-3100 (Li-cor, NE) and the dry weight (g/plant) was obtained after drying the fresh matter in an oven with air circulation at 70°C. The total dry matter was obtained by the sum of dry matter of leaves, stems, roots and fruits.

To evaluate the total production we harvested ripe fruits from five plants, when the skin color was changing from green to greenish-yellow, with the abscission layer well formed (Menezes *et al.*, 2000). A total of ten harvests was executed from February 27 to March 11. We considered fruits having commercial quality those presenting minimum attributes of quality, fresh mass and without external defects or disease symptoms for the market (Filgueiras *et al.*, 2000).

All statistical analysis were performed using SAEG (UFV) software. For the growth and assimilate partition a sigmoid curve model was adjusted (logistics and gompertz) and for the comparison of fruit yield we adopted the Tukey test at 5% probability.

## RESULTS AND DISCUSSION

There was significant ( $p < 0.05$ ) effect among the growing environments for all



**Figure 1.** Growth characters and dry mass accumulation in melon plants hybrid ‘Fleuron’ in cultivation environments control (■), Aluminet® (\*), Cromatinet® (+) and Sombrite® (○) (caracteres de crescimento e acúmulo de massa seca em plantas de melão híbrido ‘Fleuron’ nos ambientes de cultivo Controle (■), Aluminet® (\*), Cromatinet® (+) e Sombrite® (○)). Viçosa, UFV, 2003/2004.

the morphological characteristics and assimilate partition (Figure 1 and 2). Also, there was significant effect of the environments over total and commercial fruit production (Figure 3).

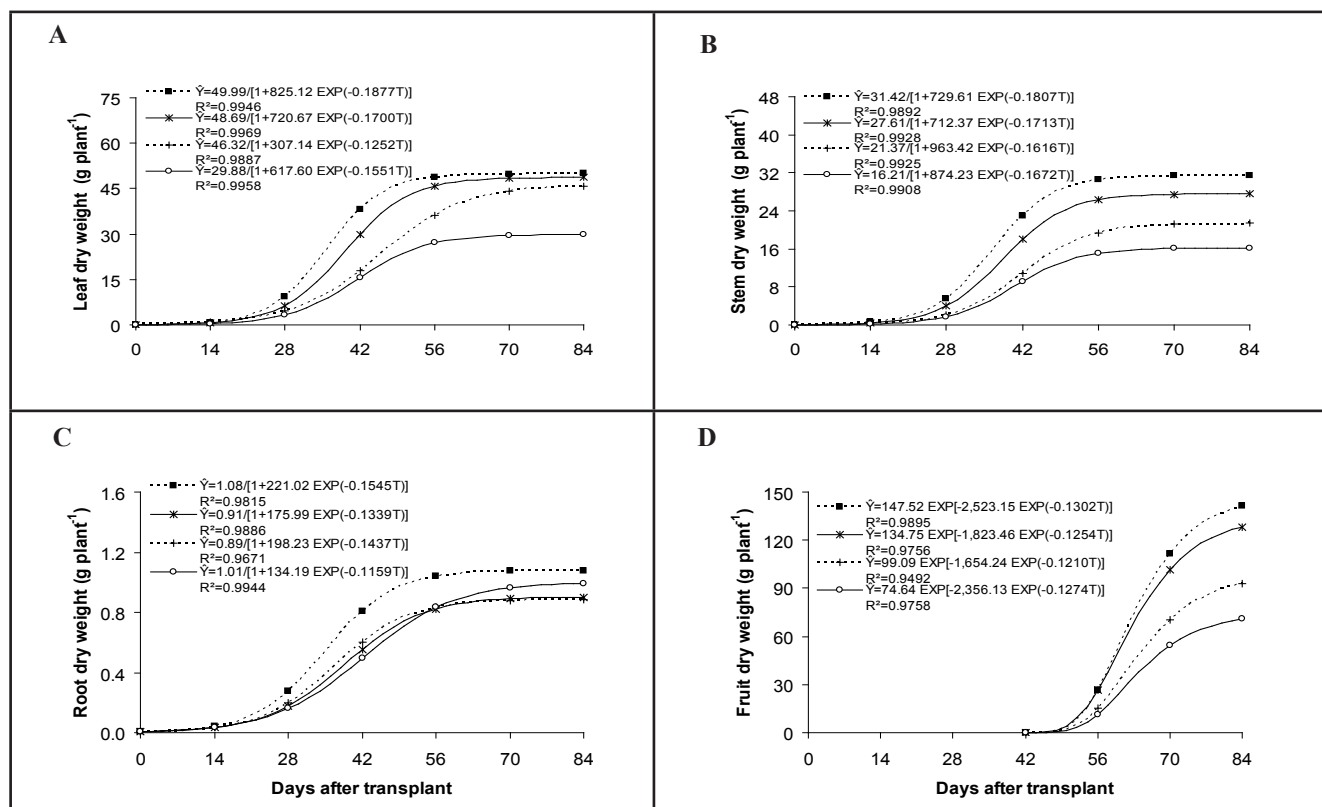
Increases of plant height up to 37.6 DAT for Aluminet®, 36.7 DAT for the control, 39.9 DAT for Cromatinet® and 39.9 for Sombrite® were detected, tending to an asymptotic maximum value with higher number on Aluminet® (294.20 cm), control (286.57 cm), followed by Cromatinet® (261.69 cm) and Sombrite® (246.26 cm) (Figure 1A). The greatest length and number of

internodes were obtained for the control and Aluminet® net, showing that both characteristics are important for the establishment of plant height (Figures 1B and 1C).

The best performance for plant height was obtained with the control and Aluminet®, because of the combined effect between length and number of internodes, which can be attributed to the higher values of solar radiation obtained at respective growth environments (Table 1). One of the important characteristics of the Aluminet® cloth are the twisted aluminum fibers, allowing 15% more

light diffusion to the shaded environment. As consequence, the Aluminet® cloth affects less the photosynthetic process and plant growth (Polysack Industries, 2003), making possible higher growth in height compared to the other screens.

Prior research has shown that the growth of melon under high radiation intensity increased the plant growth due to better synthesis and allocation of assimilates (Silva & Costa, 2003). Researching the Cantaloupe melon, Carneiro Filho (2001) obtained longer stems and internodes under full sun conditions compared to the plants kept in



**Figure 2.** Growth characters and dry mass accumulation in melon plants hybrid 'Fleuron' in cultivation environments control (■), Aluminet® (\*), Cromatinet® (+) and Sombrite® (○) (caracteres de crescimento e acúmulo de massa seca em plantas de melão híbrido 'Fleuron' nos ambientes de cultivo Controle (■), Aluminet® (\*), Cromatinet® (+) e Sombrite® (○)). Viçosa, UFV, 2003/2004.

**Table 1.** Climatic conditions during the experiment under full sun (control) and under shading nets Aluminet® 30%-O, Cromatinet® 30%-O and Sombrite® 30% (dados climáticos coletados durante a condução do experimento sob condições de pleno sol (controle) e nos ambientes sob as malhas Aluminet® 30%-O, Cromatinet® 30%-O e Sombrite® 30%). Viçosa, UFV, 2003/2004.

Weather conditions		Control	Aluminet	Cromatinet	Sombrite
Air temperature (°C)	Minimum	17.58	18.17	17.74	18.28
	Maximum	33.40	32.41	31.67	33.14
Soil temperature (°C)	Minimum	23.47	22.31	22.55	22.68
	Maximum	24.20	23.11	23.35	23.38
Relative humidity (%)	Minimum	45.30	49.24	49.72	49.76
	Maximum	80.43	87.25	86.79	88.24
PAR ( $\mu\text{mol m}^{-2} \text{s}^{-1}$ ) <sup>1</sup>		775.93	536.95	497.37	527.37
Hours of full sun		4.47	4.47	4.47	4.47
Rain (mm)		1,028	1,028	1,028	1,028

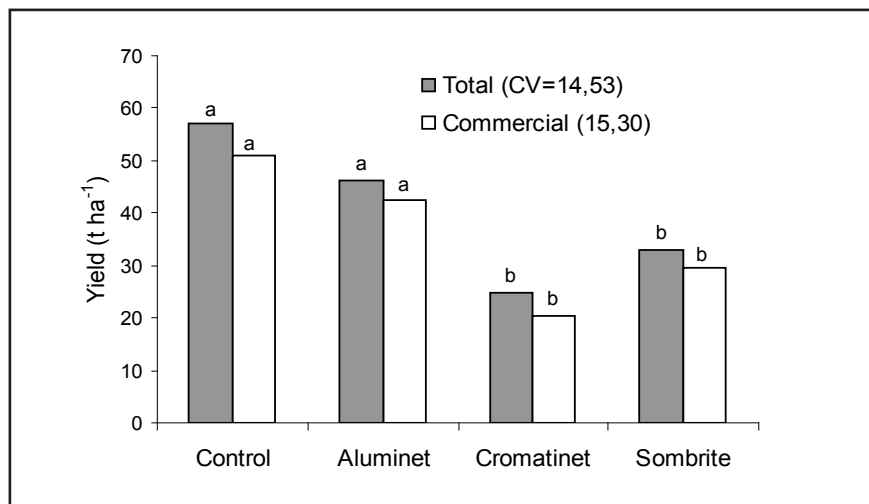
<sup>1</sup>PAR = Photosynthetically active radiation (radiação fotossinteticamente ativa).

plastic greenhouse. The soil temperature also has influence on the growth of melon. In this study, the soil temperature in the control environment was higher (Table 1), which may have favored higher accumulation of root dry matter, in comparison to Aluminet®, Cromatinet® and Sombrite® environments (Figure 1). Consequently, the increase in root growth favors the elevation of the plant height. In cucumber, the increase of soil

temperature from 20 to 30°C (JaeWook *et al.*, 2003) and from 12 to 36°C (Daskalaki & Burrage, 1997) resulted in taller plants due to higher growth and accumulation of dry matter in the root system.

The balance between the air minimum and maximum temperatures is also important for the plant growth. The optimum temperature for the melon growth ranges from 18 to 33°C (Fontes

& Puiatti, 2005). Under the Aluminet® cloth, the temperature was within the optimum range for the melon crop (Table 1). Temperatures below 18°C can reduce the translocation of assimilates from the leaves (source) to other parts of the plants (sink), including the stem as observed by Mitchell & Madore (1992). For temperatures above 33°C the plant respiration becomes high impairing the development of the plants (Fontes &



**Figure 3.** Total and commercial yield of melon fruits hybrid 'Fleuron' grown under cloth nets (produção de frutos total (PT) e comercial (PC) de melão híbrido 'Fleuron' em cultivo sob malhas). Viçosa, UFV, 2003/2004.

Puiatti, 2005).

Silva & Costa (2003) found that the reduction of light intensity had negative influence on the growth of melon plants. Nevertheless, even with the reduction of PAR, under the Aluminet<sup>®</sup> cloth, the increase in diffuse light, in this kind of net, could modulate morphological changes on the far red wavelength, between 700 and 800 nm (Larcher, 2000). In watermelon, an elevation of plant height and length of internodes were verified when the plants were subjected to higher proportions of far red in relation to red. This trend of higher growth was reverted when the far red was suspended, but keeping the treatment with red light, showing possible regulation by the phytochrome (Decoteau & Hatt-Graham, 1997; Hatt-Graham & Decoteau, 1997).

Increments of leaf area were detected up to 36.9 DAT for Aluminet<sup>®</sup>, 34.6 DAT for the control, 45.9 DAT for Cromatinet<sup>®</sup> and 42.2 DAT for Sombrite<sup>®</sup>, tending to an asymptotic maximum value of 11,498.58 cm<sup>2</sup> for Aluminet<sup>®</sup>, followed by 9,993.44 cm<sup>2</sup> for the control, 9,997.50 cm<sup>2</sup> for Cromatinet<sup>®</sup> and 7,079.60 cm<sup>2</sup> for Sombrite<sup>®</sup> (Figure 1D). The leaf area for the Aluminet<sup>®</sup> was also favored by the expansion of the leaf lamina compared to the control plants, since the number of leaves between them was similar (Figure 1E). The values for leaf area per plants were similar between the control

and the Cromatinet<sup>®</sup> environments. Although, a higher number of leaves was present in the control plants, under the Cromatinet<sup>®</sup>, bigger leaf laminae were present, compensating the lower number of leaves per plant (Figures 1D and E). Under the Sombrite<sup>®</sup> cloth, in addition to the reduction of leaf number per plant, there was less expansion of the leaf lamina compared to the Aluminet<sup>®</sup>, control and Cromatinet<sup>®</sup> environments (Figures 1D and E).

The best performance for plant leaf area was determined under the Aluminet<sup>®</sup> shade, due to the combined effect of higher leaf lamina expansion and number of leaves per plant. Such effects can be attributed to the better equilibrium between the maximum and minimum air temperatures and by the increment of 15% on the diffuse light compared to full sun (Polysack Industries, 2003).

As previously discussed for the plant height, the equilibrium between minimum and maximum air temperatures, the increase of diffuse light can modulate changes in the plant morphology. It is well known that part of the diffuse light under the Aluminet<sup>®</sup> cloth is composed by wavelengths at far red, between 700 and 800 nm (Larcher, 2000). The higher proportion of far red compared to red seems to regulate the elongation of the stem, but also the expansion of the leaf lamina by the phytochrome (Taiz & Zeiger, 2004).

The phytochrome has two sites of absorption of light, at red (*pr*) and at far red (*pfr*). When the plants are subjected to higher quantity of far red, there occurs a conversion of the phytochrome from *pfr* to *pr*, and the ratio *pfr* to total phytochrome diminishes. According to Taiz & Zeiger, (2004), the eventual reduction of this ratio, increases the synthesis of gibberellins, which enhances cell expansion and division. This kind of morphological modulation seems to have occurred in plants grown under the Aluminet<sup>®</sup> cloth, allowing better light use by the plants, resulting in higher accumulation of dry matter (Figure 1F). The morphological responses induced by the light quality, are also depending on the cultivar, as observed for the expansion of lamina leaf and number of leaves among different cultivars of lettuce grown under Aluminet<sup>®</sup> 30%-O and Cromatinet<sup>®</sup> 30%-O nets (Abaurre, 2003).

The smaller leaf area from the control plants compared to Aluminet<sup>®</sup> may be related to the plant strategy of reducing the exposing areas to conditions of excessive irradiance, which could result in higher energy expending to keep the physiological processes of plant protection, such as the synthesis of carotenoid pigments and enzymes involved in the photo oxidative reactions (Larcher, 2000).

The lower values of leaf area under Cromatinet<sup>®</sup> and Sombrite<sup>®</sup> seem to be related not only to the reduction of light intensity, as well as to the light quality. According to Taiz & Zeiger (2004), artificial conditions that favor the increase of blue light in detriment of red light reduction, may lower the cell rate division and cell elongation. Carneiro Filho (2001), working with melon found smaller leaf area and number of leaves under lower light intensities. The authors concluded that the light was not sufficient to promote the synthesis of assimilates required for the plant growth.

There was more increase in total dry matter up to 54.2 DAT for the control, 55.0 DAT for the Aluminet<sup>®</sup> and 55.9 DAT for the Sombrite<sup>®</sup> nets, followed by a period of reduction. Then, the maximum asymptotic values were

225.27 g/plant at full sun, followed by 206.18 g/plant using Aluminet<sup>®</sup>, 159.62 g/plant using Cromatinet<sup>®</sup> and 116.12 g/plant using Sombrite<sup>®</sup> cloths (Figure 1). The highest accumulation of dry matter at full sun accounted for the higher values of stem, roots and fruits dry matter (Figures 2B, C and D), once these plants had similar values for the leaf dry matter found for the Aluminet<sup>®</sup> cloth (Figure 2A).

Accumulation of total dry matter per plant reached its highest level under full sun, which can be attributed to the better use of photo assimilates in promoting higher root growth; and as consequence, the use of all soil resources, which was favored by the higher soil temperature (Table 1). Such favorable growing conditions allowed an earlier increment of mass and number of leaves, as well as the maximum asymptotic maximum values. Thus, the combination of such favorable conditions could be responsible for the performance in accumulating dry matter in the different plant organs under full sun. Under the Aluminet<sup>®</sup> net, some morphological changes such as expansion of the leaf lamina and number of leaves per plant, contributed to the increment of leaf, stem, fruit and total dry matter compared to Cromatinet<sup>®</sup> and Sombrite<sup>®</sup> (Figures 1F, 2A and 2D).

Accumulation of dry matter by the plant is the result of the balance between total PAR and the absorbed by the leaves, by the efficiency in converting to dry matter and the partition between sources and sinks (Larcher, 2000). Therefore the synthesis of photo assimilates and their partition to different organs at full sun propitiated earlier growth and maximum values for the leaf, stem, root, fruit and total dry matter compared to the shaded treatments. Carneiro Filho (2001) found that at full sun the melon plants had higher aerial dry matter compared to plastic greenhouse plants. And in lettuce, the reduction of solar radiation under Aluminet<sup>®</sup> 30%-O, Aluminet<sup>®</sup> 40%-O and Cromatinet<sup>®</sup> 30%-O nets reduced the accumulation of dry matter in the leaves and roots (Abaurre, 2004).

Higher total and commercial fruit production was obtained under full sun

and Aluminet<sup>®</sup> conditions, compared to Cromatinet<sup>®</sup> and Sombrite<sup>®</sup> yields (Figure 3). The highest solar radiation obtained under full sun conditions (Table 1), and earlier increment on the number of leaves as well as its asymptotic value (Figure 1E), certainly contributed to the growth and accumulation of dry matter in the fruits, due to a better use of the solar radiation. Under Aluminet<sup>®</sup>, the larger expansion of the leaf lamina and the number of leaves per plant (Figures 1D and 1E), which were favored by the air temperature and diffuse light, seem to compensate the reduction of solar radiation, resulting in higher yield compared to Cromatinet<sup>®</sup> and Sombrite<sup>®</sup> environments.

The response of melons and watermelon to shade has been controversial. Sin *et al.* (1991) working with melon and Nkansah *et al.* (1996) with watermelon found higher mass production of fruits under higher radiance intensity of 1,200  $\mu\text{mol m}^{-2} \text{s}^{-1}$  PAR and lower air temperatures (< 33°C). Even under low radiance intensity of 600  $\mu\text{mol m}^{-2} \text{s}^{-1}$  PAR, the photosynthesis and production of fruits were favored by the lower temperatures. But, Nishizawa *et al.* (1998) concluded that the shading of 50% did not reduce the melon fruit mass production when compared to full sun yield. Also for watermelon plants, the highest yield was obtained under shading conditions with 800  $\mu\text{mol m}^{-2} \text{s}^{-1}$  PAR compared to the 1,800  $\mu\text{mol m}^{-2} \text{s}^{-1}$  PAR present under full sun conditions (Calatayud *et al.*, 2000). On the other hand, Nishizawa *et al.* (2000) and SangGyu *et al.* (2003) found that shading was responsible for the reduction of melon fruit mass.

The melon species presents a light saturation point between 1,000 and 1,200  $\mu\text{mol m}^{-2} \text{s}^{-1}$  PAR (Kitroongruang *et al.*, 1992; Valantin *et al.*, 1998), thus well below the 1,800  $\mu\text{mol m}^{-2} \text{s}^{-1}$  PAR light present under tropical full sun shine day (Nkansah *et al.*, 1996). Under clear skies without clouds, it can be assumed that the reduction of radiation imposed by the nets, did not affect the photosynthesis and subsequently the growth and yield of melon, since the values of radiation are still within the optimum level required by the crop.

But, during the 90 days of the crop cycle, the number of hours of full light per days was in average 4.47, much lower than the 9 hours found in the semi-arid conditions of the Northeastern (Silva & Costa, 2003). Thus, under cloudy days, the reduction of solar radiation imposed by the nets could limit the photosynthesis, the plant growth and production, because the levels of radiation were below the saturation point for the crop, which might reduce the beneficial effects given by the shading cloths.

The incidence of low daily sun light and the good growth and yield under 30.85% shading given by the Aluminet<sup>®</sup> 30%-O net, indicate that this melon species does not require elevated levels of light as thought before. Under semi arid conditions present in the North of Minas Gerais State and the Brazilian Northeastern, where the daily number of full light averages 9 hours, the growth under shading can be promising, opening the possibility for agroforestry and intercrop systems of cultivation.

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