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Ghrab M., Gouta H., Ben Mimoun M.

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'Mateur' and 'Ohadi' cultivars characteristics over fifteen years of production in Sfax semi-arid region

M. Ghrab*, M. Ben Mimoun and H. Gouta***
*Station d'Arboriculture Fruitière, IO, Route Soukra km 1.5, 3003 Sfax, Tunisia
**Laboratoire d'Arboriculture Fruitière, INAT, 43 av. Charles Nicole, 1082 Tunis-Mahrajene, Tunisia
ghrab_m@yahoo.com

SUMMARY – Pistachio-tree performance of two female cultivars, a local one 'Mateur' (the most important cultivar in Tunisia) and a foreign one 'Ohadi' (an Iranian cultivar), has been studied in Sfax region. The yield per tree of each cultivar was analysed regarding the climatic conditions, especially rainfall, during a period of fifteen years. The flowering period and production characteristics (weight, shell dehiscence and size) were also monitored. The results show important differences between the two cultivars under the semi-arid conditions of Sfax region.

Key words: Pistachio, cultivars, flowering, yield, 'Mateur', 'Ohadi'.

RESUME *– "Caractéristiques des cultivars 'Mateur' et 'Ohadi' sur 15 ans de production dans la région semi-aride de Sfax" Les performances de deux variétés de pistachiers femelles 'Mateur' (variété locale) et 'Ohadi' (variété iranienne) ont été étudiées dans la région de Sfax. Le rendement par arbre de chaque variété a été analysé en relation avec les conditions climatiques et spécialement les précipitations sur une période de 15 ans. Un suivi de la période de floraison et des caractéristiques de la production (poids, pourcentage de déhiscence, taille) a été aussi effectué. Les résultats montrent des différences importantes entre les deux variétés sous les conditions semi-arides de la région de Sfax.*

Mots-clés : *Pistachier, variétés, floraison, rendement, 'Mateur', 'Ohadi'.*

Introduction

In Tunisia, pistachio (*Pistacia vera* L.) has been grown from ancient time up to now. But during the last forty years large areas were planted with pistachio especially in the semi arid region to profit from its high tolerance to drought. As a result, nowadays, pistachio growing surface is more than 43,000 ha concentrated in the center and south of the country (98% of the total area). However, the production is still very weak with 1200 t/year. The inadequate management of the orchard is one of the most important problems.

Another characteristic is that all this industry is almost entirely based on only one cultivar, 'Mateur', planted from the north to the south of the country.

On this work, we tried to compare an introduced cultivar ('Ohadi': an Iranian one) with 'Mateur' under the semi-arid conditions of the Tunisian center area over a period of fifteen years.

Materials and methods

This work was carried out in a pistachio orchard of 'Mateur' and 'Ohadi', at Taous experimental station (Sfax region, Tunisia), a semi-arid zone with an annually rainfall of 220 mm.

The pistachio trees were planted in 1968 using seedlings of *Pistacia vera* as rootstock, with 12x12 m spacing. The orchard is grown without any irrigation.

Yield per tree was collected for each cultivar during a period of fifteen years (1983-1997).

During three years, a qualitative analysis of fruits has been made using a sample of 50 fruits by

tree. Whole fruits (fruits plus hull), dehulled nuts and kernels were weighted and measured (length, width, thickness). The percentage of dehiscence is calculated on a sample of 100 fruits by tree.

Observations on the flowering period have also been made during two years. Dates of the beginning and end of flowering are noted respectively when 10% and 95% of inflorescences are opened.

Results and discussion

Flowering period

'Mateur' is the earliest flowering cultivar starting during the 3rd week of March and the 2nd week of April respectively during the 1st and the 2nd year (Fig. 1). In both cases, 'Ohadi' follows ten days after. The effective flowering period varies from 3 weeks for 'Mateur' to 2 weeks for 'Ohadi'.

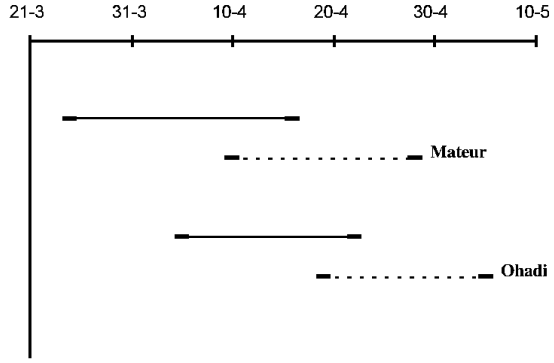

Fig. 1. Flowering period of 'Mateur' and 'Ohadi' cultivars (- - - 98 and — 99).

The time difference is due to climatic conditions and genotype differences. The climatic conditions were different between the two years and the chilling requirement and the warm temperatures demand differs between cultivars. Kaska (2002) reported that Iranian pistachio cultivars has high chilling requirement. Vargas *et al*. (1997) observed that 'Mateur' has an early flowering starting the 1st week of April.

Yields

The yield per tree of both cultivars during the study period varied annually (Fig. 2). Both cultivars show an important alternate bearing. Depending of the year, the yield ranged from 16 kg/tree and 6 kg/tree respectively for 'Ohadi' and 'Mateur' to no production at all reflecting the variability and the bearing characteristics of pistachio. Crane and Iwakiri (1981) indicate that the pistachio is a species that presents a well-marked bearing. The production can vary 3 to 5 times between year "off" and year "on" (Johnson and Weinbaum, 1987).

Overall, 'Ohadi' cultivar was more productive (4.84 kg/tree) than the local cultivar 'Mateur' (2.53 kg/tree) during the fifteen years of study.

During some consecutive years, a low production is observed for both cultivars instead of a cycle of "on" and "off" yield. This variation is related to the year rainfall. During the study period the average value of annual rainfall was 220 mm at the Taous station but with important variation between the years. It ranged from 109 mm (1988) to 408 mm (1996). The yearly yield variation is closely related to annual rainfall (Fig. 2). The same tendency was observed for the yield and the rainfall.

The water was a limiting factor under our study conditions, which is observed by the low production level per tree. The observed yield for the studied cultivars was weak compared to results

shown by other authors and in different sites of experimentation. Oukabli (1995) signals an average yield by tree of 9.7 kg under rainfall conditions for the 'Mateur' cultivar for the period of age between 24 and 30 years. However, annual rainfall was 450 mm in his study. Whereas, under irrigation, Maggs (1973) suggests that the average yield for a good cultivar seems to be about 1 kg dry nuts for each year of field life up to a maximum of 30 kg. Vargas *et al*. (1997) and Rouskas (2002) consider 'Mateur' as an interesting cultivar under their study conditions.

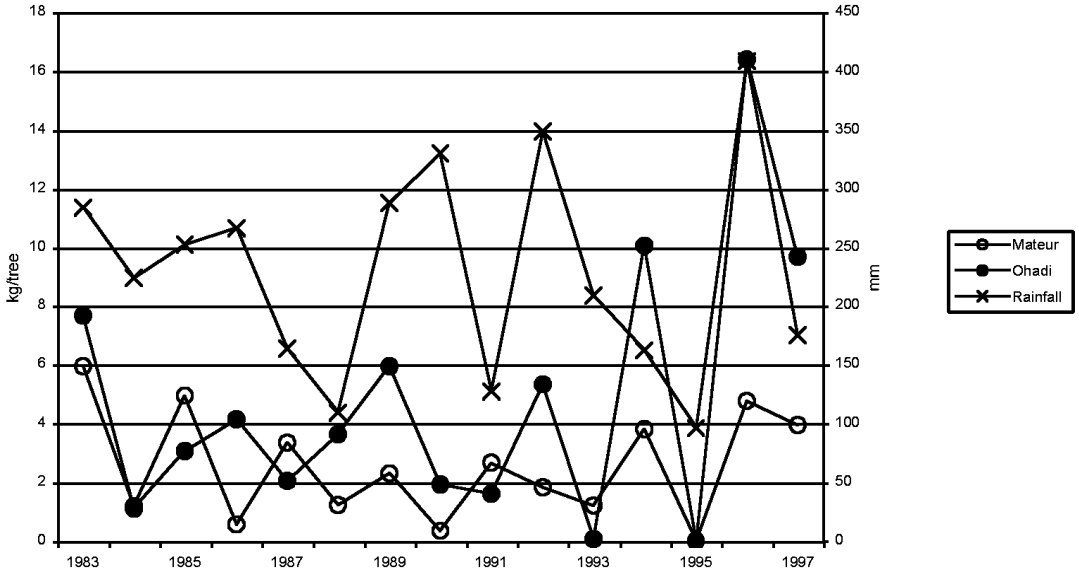

Fig. 2. Pistachio production for 'Mateur' and 'Ohadi' cultivars (kg/tree) and the annual rainfall (mm) over fifteen year of study (1983-1997).

Fruit characteristics

Concerning the fruit characteristics, the 'Ohadi' cultivar produced fruit with a higher weight and a larger size (Table 1). The average nut weight was 1.24 g for 'Ohadi', whereas it is 0.90 g for 'Mateur'. The 'Ohadi' fruit was thicker, larger and longer. These characteristics confirm results observed by other authors working with 'Ohadi' (Seyfettin Atli *et al*., 1998) and 'Mateur' (Vargas *et al*., 1997).

Table 1. Nut weight (g), length (mm), width (mm) and thickness (mm) for 'Mateur' and 'Ohadi' cultivars

	Nut weight (g)	Nut length (mm)	Nut width (mm)	Thickness (mm)
'Mateur'	0.90	19.51	11.47	9.69
'Ohadi'	1.24	20.68	13.67	13.36

The split nuts percentage is higher for 'Mateur' than 'Ohadi' and with a lower blank fruit percent which is an interesting characteristics (Table 2).

Table 2. Percentage of blank, split and no split nut for 'Mateur' and 'Ohadi' cultivars

	Blank (%)	Split (%)	Non split (%)
'Mateur'	5.4	81.4	13.2
'Ohadi'	11.5	55.2	33.3

Conclusions

This work showed the effect of the rainfall on the production of the pistachio under the semi arid climate of the center and south of Tunisia.

It shows also the potential of 'Ohadi' cultivar that could be an interesting cultivar. Its yield per tree is higher than 'Mateur' over fifteen years of study.

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