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## An investigation on the male determination for some female varieties throughout five years (1992-1996) grown at Ceylanpinar State Farm in Şanlıurfa conditions

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**SUMMARY** - This research was conducted at Ceylanpinar State Farm between 1992 and 1996. In this farm there are different male trees spread in the orchards of 7 female varieties. In this investigation the male trees, which are different from each other even in the same orchard, were determined in the first selection. The observations were made on inflorescence of male and female trees for five years. So, suitable male trees were selected for female varieties grown in Şanlıurfa conditions. According to five years' result some male trees were determined for Kirmizi, Ohadi, Siirt, Vahidi, Sefidi, Bilgen, and Mümtaz female varieties.

**Key words:** Pistachios, male trees, inflorescence.

**RESUME** - "Recherches sur la détermination mâle pour certaines variétés femelles cultivées pendant cinq années (1992-1996) à la Ferme d'Etat de Ceylanpinar dans les conditions de Şanlıurfa". Cet essai a été mené à la Ferme d'Etat de Ceylanpinar entre les années 1992-1996. Dans cette ferme, il y a différents arbres mâles disséminés dans les vergers de sept variétés femelles. Au cours de cet essai, les arbres mâles qui sont différents les uns des autres même à l'intérieur du même verger, ont été déterminés pendant la première sélection. Les observations ont été faites sur des inflorescences d'arbres mâles et femelles pendant cinq ans. Donc il y a eu sélection des arbres mâles adéquats pour les variétés femelles cultivées dans les conditions de Şanlıurfa. D'après les résultats de ces cinq années, quelques arbres mâles ont été déterminés pour les variétés femelles Kirmizi, Ohadi, Siirt, Vahidi, Sefidi, Bilgen, et Mümtaz.

**Mots-clés :** Pistaches, arbres mâles, inflorescence.

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### Introduction

Pistachio nut is dioecious. It has been recognized since 1697 (Whitehouse and Stone, 1941). Pistachio flower has no petals which attract pollination by insects. Therefore, pollination occurs by the transport of pollens from male to female trees by wind. In order to get yield pollination and fertilization is necessary. Therefore pistachio orchards must contain male trees and the ratio of male to female should be 1/8 or 1/11 (Ayfer, 1964; Kaşka, 1990). In Turkey, flowering time is during the first two weeks in April for most districts. To get maximum nut production, it is necessary to have enough male trees to insure adequate pollination.

It may be possible to gather and store pollen and artificial application (Kaşka *et al.*, 1989). Artificial pollination are worked out (Kuru, 1995), however, natural pollination remains the best insurance for crop setting (Ayfer and Kuru, 1990). At the orchards male trees must be but artificially pollen may be apply to get high yield. The best thing is male and female trees' flowering time must be overlapped in the orchard.

Male trees generally spreads their pollen before the stigmas are not receptive in female trees. That is prodandrous is common (Ak, 1992; Koroğlu and Köksal, 1995). In some pistachio producer countries such as USA, Syria, Tunisia, Spain, etc., male tree selections were made for their female varieties (Hadj-Hassan, 1986; Marchinez-Palle and Herrero, 1993; Vargas *et al.*, 1995) In Turkey similar studies are going on different province as well (Atli *et al.*, 1995; Çağlar and Kaşka, 1995;

Köroğlu and Köksal, 1995). This may be first problem to establishing new pistachio orchards to use suitable male to female cultivars.

At Ceylanpinar state farm there are three main varieties such as Siirt, Kirmizi, Ohadi and other some Iranian varieties. At these orchards we have observed that there are different male trees spread in the orchards.

In Turkey there are not any male trees that determined as name and features but some trials are going on as it is mentioned above. Suitable male trees for commercially produced varieties of Pistachio are very important. It is not forgotten that male trees which will be used in the commercial orchard some features of males should be considered. The synchronization is not enough to decide for good male trees. Some features of the best male Pistachio trees summarized as follows (Ak, 1992): (i) growth must be strong and upright; (ii) the flowering period must be synchronize; (iii) flowering period of the male should be long enough to overlap with the flowering period of females; (iv) the number of clusters must be high; (v) flower clusters must be big size; (vi) the amount of pollen production (each cluster) must be high; (vii) yield potential must be high; (viii) the germination rate of pollen must be high; (ix) the pollen's viability *in vivo* must be long and (x) it must not show alternate bearing.

In this present study deals with subject concerning flowering period to synchronize selecting suitable male types for same female varieties of pistachio which is grown at Ceylanpinar state Farm in Şanlıurfa.

## Materials and methods

This experiment was conducted at Ceylanpinar State Farm throughout 5 years (1992-1996) At the beginning of this work (in 1991 summer) all the orchard observed to find out male trees which are differed from each others and marked out.

Later on the branches are cut off these marked trees gathered and observed that whether some of them same or not. At the end 24 male types determined in first selection. These selected trees are marked out with number and phenological observations were made on them. However some female trees (Kirmizi, Siirt, Ohadi, Hacı Reşo, Bilgen, Vahidi, Sefidi) are numbered and similar phenological observations made on them as well.

The observation criteria for male types and female varieties as follows (Hadj-Hassan, 1986): (i) bud swelling: bud swelling date determined; (ii) bud bursting: bud bursting date determined; (iii) beginning of flowering: opening more than 10% of the flowers on the tree; (iv) full flowering: opening more than 75% of the flowers on the tree; (v) end of flowering: opening more than 90% of the flowers on the tree and (vi) flowering period (day): the days between beginning of flowers and end of flowers.

Some climatic features were given Table 1.

## Result and discussion

### Phenological observations in male and female pistachio trees

The phenological observations were made on selected 24 male trees at Ceylanpinar State Farm between 1992-1996. The dates which related to bud swelling, bud bursting, beginning of flowering, full flowering and end of flowering, were given Table 2. Same observations on the female pistachio varieties which are growing same area were determinate as well. In additionally, flowering periods of male and female pistachio trees were calculated considering of beginning and end of flowering stage.

According to five years results, bud swelling date in male trees were occurred between 8-17 March. In female pistachio varieties bud swelling dates were changed between 15-27 March. Bud bursting date were changed between 13 March - 4 April in male and female pistachio varieties.

Table 1. Monthly averages of some important climatic factors of the Ceylanpınar State Farm

Years	Months	Min. (°C)	Max. (°C)	Mean (°C)	Relative hum. (%)	Precipitation (mm)
1992	January	-2.7	7.7	1.8	65.1	31.6
	February	-1.0	7.5	2.6	70.9	109.4
	March	1.1	15.7	7.8	59.7	15.3
	April	6.6	23.6	15.1	59.4	14.6
	May	10.1	28.0	20.4	60.3	32.2
1993	January	-0.8	10.6	4.3	69.3	29.2
	February	-0.4	10.8	4.4	66.6	35.4
	March	1.9	16.9	9.1	59.7	34.8
	April	7.7	22.7	15.0	61.0	29.2
	May	13.0	25.7	19.4	65.0	92.4
1994	January	3.4	13.7	7.9	76.9	101.8
	February	2.1	13.7	7.3	68.9	41.1
	March	4.6	19.1	11.3	65.5	10.8
	April	9.8	26.4	18.1	60.3	42.9
	May	13.5	32.4	23.4	44.2	37.6
1995	January	2.4	11.8	6.4	78.0	45.0
	February	2.6	15.6	8.4	70.6	30.0
	March	3.8	19.6	11.1	65.5	20.2
	April	7.8	23.5	15.6	62.1	51.1
	May	12.7	32.5	23.2	49.0	8.3
1996	January	3.1	10.5	6.4	79.3	148.9
	February	2.8	14.2	8.0	69.3	43.8
	March	5.7	14.9	10.1	77.6	140.1
	April	7.0	20.6	13.7	67.4	28.8
	May	13.5	32.5	23.4	48.0	10.1

The first beginning of flowering have been started 29 March in male trees, 31 March in female Kirmizi variety. Full flowering stage in male and female pistachio trees occurred in April 1-16. End of flowering stage was obtained 5-21 April in male and female pistachios.

Flowering period was calculated as it is mentioned above. In male trees, flowering period was obtained between 6-10 days changing male to male (Fig. 1). The shortest (6 days) flowering period was observed male type 2. The longest (10 days) days in male types were observed male No. 9, 18 and 22. The flowering period occurred 10-12 days in female pistachio varieties. As it is seen clearly flowering period of male types are shorter than females (Ak, 1992).

### Synchronization of male and female pistachio trees

As it is well known, pollination and fertilization is necessary for pistachio orchards to obtain seeded fruit. Because of this reason, male trees should be in pistachio orchards. A good males should have some features. These have been mentioned in introduction.

Flowering period of male and female must be synchronize. Flowering periods of males and females were presented in Fig. 1. According to Fig. 1, female pistachio varieties have been synchronized as; Kirmizi with 1, 3, 4, 15 and 22 male types, Siirt with 7, 9 and 23 male types, Ohadi with 17 and 21 male types, H. Reşo with 7, 13, 14 and 20 male types, Bilgen with 17 and 21 male types, Vahidi with 17 and 21 male types, Sefidi with 7, 13, 14, 18 and 20 male types and Mümtaz with 13, 14 and 18 male types

Table 2. Average of flowering date and period of male types and some female varieties grown at Ceylanpınar State Farm conditions between 1992-1996 years

Male No. Females	Bud swelling	Bud bursting	Beginning of flowering	Full flowering	End of flowering	Flowering period (day)
1	16 March	19 March	3 April	8 April	11 April	9
2	14 March	21 March	6 April	9 April	11 April	6
3	9 March	19 March	1 April	4 April	8 April	8
4	9 March	19 March	1 April	4 April	8 April	8
5	8 March	13 March	29 March	1 April	5 April	8
6	10 March	14 March	30 March	2 April	5 April	7
7	16 March	22 March	7 April	11 April	15 April	9
8	17 March	20 March	4 April	8 April	12 April	9
9	14 March	21 March	4 April	8 April	13 April	10
10	10 March	15 March	31 March	3 April	5 April	6
11	10 March	15 March	29 March	1 April	4 April	7
12	10 March	19 March	5 April	9 April	12 April	8
13	13 March	25 March	8 April	12 April	16 April	9
14	16 March	24 March	8 April	12 April	16 April	9
15	11 March	19 March	2 April	6 April	9 April	8
16	16 March	24 March	5 April	8 April	12 April	8
17	16 March	23 March	10 April	14 April	17 April	8
18	17 March	25 March	8 April	12 April	17 April	10
19	13 March	26 March	9 April	12 April	17 April	7
20	16 March	23 March	8 April	11 April	16 April	9
21	14 March	26 March	11 April	14 April	18 April	8
22	13 March	21 March	2 April	7 April	11 April	10
23	15 March	21 March	5 April	9 April	13 April	9
24	10 March	17 March	29 March	2 April	5 April	8
Kırmızı	15 March	25 March	31 March	6 April	10 April	11
Siirt	19 March	26 March	5 April	10 April	15 April	11
Ohadi	24 March	2 April	10 April	16 April	19 April	10
Hacı Reşo	22 March	30 March	6 April	12 April	16 April	11
Bilgen	27 March	4 April	10 April	16 April	20 April	11
Vahidi	26 March	2 April	9 April	16 April	21 April	13
Sefidi	22 March	30 March	6 April	12 April	17 April	12
Mümtaz	23 March	31 March	7 April	14 April	18 April	12

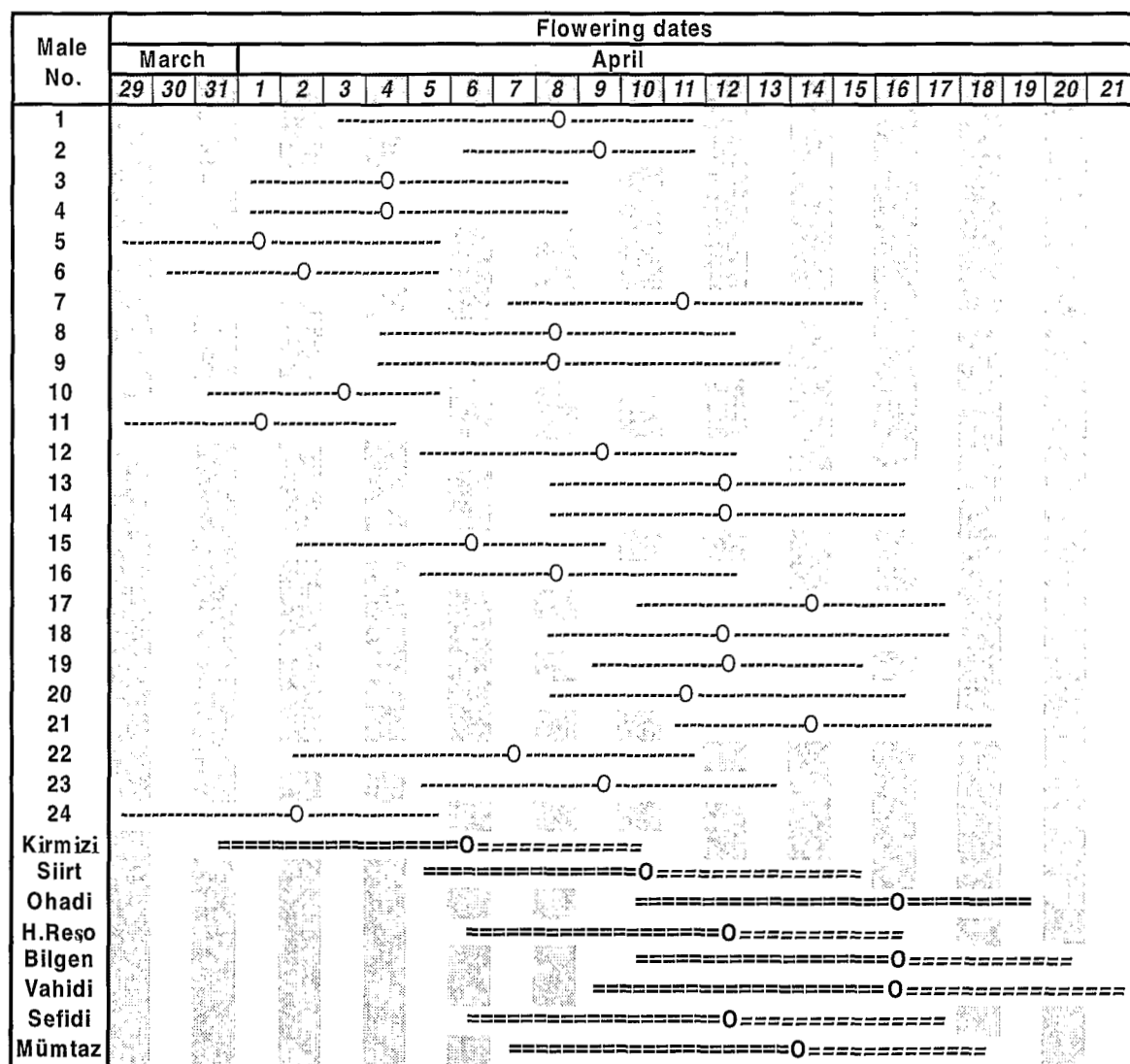


Fig. 1. Flowering period in male types.

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