Pollination requirement of select almond clones of Western Turquey

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Pollination requirement of select Almond clones of Western Turkey

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ABSTRACT-RESUME

Pollination requirement of 21 selected clones and 3 cultivars have been studied. All clones found to be self-incompatible and need cross pollination. The most suitable pollinizer for each clone have been identified.

La pollinisation de 21 clones sélectionnés et de 3 cultivars a été étudiée.
Tous les clones observés sont autoincompatibles et exigent une pollinisation croisée. Les meilleurs pollinisateurs pour chaque clone ont été déterminés.

INTRODUCTION

With very few exceptions, cross pollination is essential for fruit setting in almond (P. amygdelus Batsch.). This is due to incompatibility which is controlled by a multiple allelic gene as it is in cherries (Kester and Assay, 1975). Gagnard (1955) and Wilkerling (1955) found that all of the cultivars they studied were self-incompatible. Schanderl (1960) found that 19 cultivars out of 23 were self-incompatible and need cross-pollination. The existence of self-compatibility in Tuono and Filippo Ceo cultivars was, established by Godini (1977). In our programme for Western Turkey on the improvement of almond growing, a pollination requirement of selections must be studied in order to plant suitable pollinizer in settling new almond plantations with selected clones.

MATERIALS AND METHODS

This work has been carried out in the experimental almond orchard of the Department of Pomology and Viticulture, at Bornova, Izmir. 21 selected clones and 3 known cultivars have been tested.

Fenological studies have been maintained since 1973. The date of flowering was recorded at the beginning of blooming (10 % opening), at full bloom (50-60 % opening) and at the end of blooming season (80-90 % opening).

Flowers were emasculated one day before its opening. Almond flowers are most receptive to effective cross pollination, a day or two after, too, and remain receptive for only 3 or 4 days (Griggs and Iwakiri, 1964). These findings have been considered in our experiments as well. Since pollinating insects are only attracted to the resplendent flower parts, the emasculated ones are safe from uncontrolled pollination. Therefore no isolation has been made and flowers are left open after emasculation and pollination. Around 250 flowers have been used for each combination and fruit set has been recorded after the June drop.

RESULTS AND DISCUSSIONS

Fenological investigations.

Fenological records, taken of 167 clones existing in the collection orchard at Bornova, have shown fairly large variation in flowering dates. Between the earliest and the latest flowering clones there are 30 to 35 day differences as average. This difference was as large as 44 days in one year. Since particular attention has been given to late flowering during the selection, the difference in flowering dates of selected clones is much lower; it is 17-22 days only.

Average flowering periods have been shown in Figure 1. Some of the clones flower 1-5 days later than Texas which is a known late flowering cultivar.

The duration of flowering periods differ according to clones and seasons. It is as short as 7 days in some years (1973) and 17 days in the following year for the same clone (17-5). On the average of 5 years (1972-1976), flowering period is 9,2 days in 101-9, and it is 15,8 days in 17-2. The duration of the flowering period seems to be a very important factor in the productivity of a clone.

Pollination Studies

The aim of the pollination studies was to find out the most suitable pollinizers for each clone. Weather conditions during the formation and the differentiation of flower buds in all clones. Hardening started just after the terminal bud formation and almost all of the kernels had hardened in 2 weeks. Ceasing of shoot growth generally coincides with increasing of temperatures and decreasing of relative humidity. Shoot growth completely stopped by the end of June in clones 2-1 and 120-1, differentiation occurred in the second half of July in both clones. Differentiation and ceasing of shoot growth are 2-3 weeks later in 101-13.

In 1977, differentiation was 10 days earlier than 1976 in 2-1 and 120-1, the difference between years may be due to the difference temperature and relative humidity. The temperature was higher and relative humidity was lower in 1977 than 1976. In 101-13 the time of differentiation was almost the same in both years. This late flowering clone has a later differentiation and slower growth rate compared with 2-1 and 120-1. The difference was quite distinct at the time of pollen formation. In 2-1 and 120-1, where flowering times are much earlier, pollen formation occurred on December 7 in 1976 and November 28 in 1977. in 101-13, pollen formation occurred on December 15 in both years.

The most significant result of this experiment is the difference in the time of differentiation and of pollen formation between the early and late flowering clones. This is in accordance with the result of Vasilev

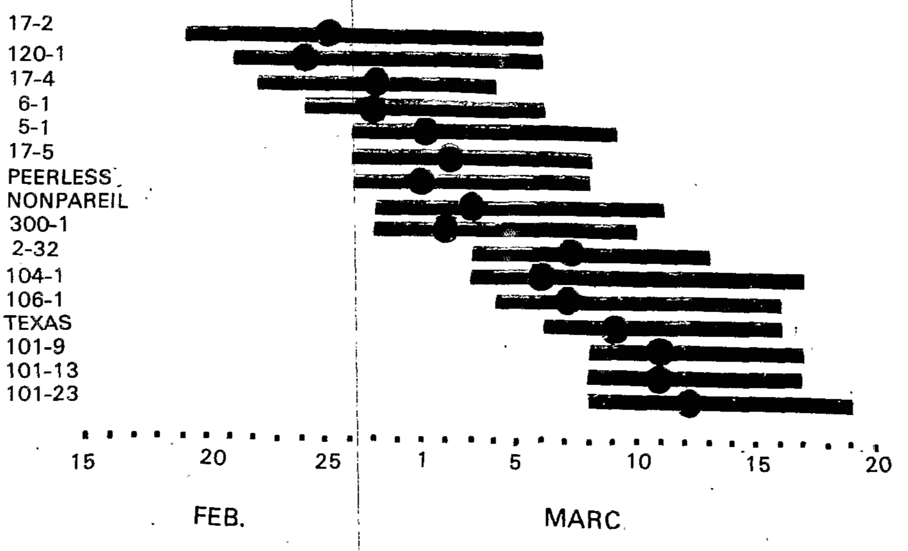

Figure 1. Average flowering periods of clones based on five year records.

and Baev (1967) and Yablonskii (1972). Differentiation ocurred in the first half of July in 120-1, in the second half of July in 2-1 and in the first week of August in 101-13 which is a very late flowering clone while the other two, flower much earlier. Similarly earlier flowering clones (2-1 and 120-1) had flowering seasons which play an extremely important part in the crop production in almonds. It is more likely to have unfavorable weather because the flowering season is earlier than any other decidious fruit species. Some of the flowers may escape from damage if the duration of flowering is longer. It provides longer time for pollination and fertilization. Very low fruit setting may be obtained in one year and percentage of fruit setting may be much higher in the following year for the same combination. This is mainly du to the unfavorable weather conditions on the day of pollination. For example, fruit setting of 2-32 x 104-1 and 2-32 x Nonpareil combinations were zero in 1973, but in the following year they were 20.5 and 19,8 percent respectively. 20 % fruit setting has been regarded as the minimun requirement for a pollinizers. Some combinations have given as much as 82.4 % setting '5-1 x 17-4) with some pollinizers. Suitable pollinizers for each clone or cultivar tested have been shown in Table 1.

Table 1

Sultable pollinizer for each cione and cultivar

Clones or cultivars	Suitable pollinizer
2-32	Texas, 101-9, 101-23, 104-1
5-11	17-4, 120-1, 17-5, Nonpareil, 300-1, 104-1, 17-2, 6-1
6-1	Nonpareil, 5-1, 17-2, 120-1, 17-5
17-2	120-1, 5-1
17-4	6-1, 17-2, 120-1, 5-1, 300-1, 17-5
17-5	6-1, 5-1, 17-4, 300-1, 120-1, Nonpareil
101-9	Texas, 101-23
101-13	Texas, 101-23
101-23	Nonpareil, 101-9, 101-13, Texas, 104-1, 2-32
104-1	5-1, 101-23
120-1	5-1, 17-4, 17-2, 17-5, Nonpareil, 5-1
300-1	6-1, 5-1, 17-5, Nonpareil, 17-4, 120-1
Nonpareil	6-1; 104-1, 300-1, 17-5, 5-1, 17-2, 120-1
Texas	101-9, 2-32, 101-13, 104-1, 101-23

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