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Short Communication

Chilling duration of Silifke-Mersin region and its affects on fruit growing

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This experiment was carried out during 1975 to 2011 in Silifke-Mersin. In this study, chilling duration of the last 35 years in Silifke-Mersin area (total chilling time below +7.2°C was calculated as hour) was determined and the effects of chilling duration on cultivation of temparate zone fruits were investigated. It was found that the winter season between the years of 1991 to 1992 was the coldest period with 1006 h and the winter season between 1983 to 1984 was the mildest period with 13 h. At the end of the research, it was seen that economic efficiency could not be gotten after mild winters, in this region especially from apricot cultivars (such as 'Precoce De Tyrinthe', and 'Bebeco') which require moderate and high chillling duration. According to the results, dormancy breaking chemicals (such as Dormex and winter oils) should be treated to get economic efficiency from old orchards. High chill fruit cultivars should not be grown since they can not produce economical yield. In terms of chilling requirement, fruit cultivars which will be grown should be suitable for the Silifke region.

Key words: Fruit, chilling requirement, dormancy breaking agent, cultivar.

INTRODUCTION

It is important to select the varieties of temperate zone fruits because of the long-lived fruit trees in the orchards. In the process of cultivating the deciduous fruit varieties in the areas having short and warm winters like the Mediterranean region, one of the major problem is to meet the winter chilling requirements of the plant species ecologically (Kaska et al., 1981). The cultivars having low-chilling requirement are supposed to be given importance in the areas, (especially in the Mediterranean coast region), which have warm winters. It is recommended that the market season times of the stone fruits should be extended more. To succeed it, the adaptation of earlier and later cultivars than the ones existing now should be tried. For the early ones, the Mediterranean coast region is needed to be considered. For the cultivation in this area, the most important subject is the types having low-chilling requirement (Kaska, 2001).

The precondition for the cultivars to be cultivated in the Mediterranean coast region is the low-chilling requirement (Kaska, 2001). Japanese plums (*Prunus salicina* Lindl.) can be grown in the areas having warm winters and no-frost risk in springs because they have low chilling requirement and low total-temperature to flower. For this reason, we must give importance to the Japanese plums cultivation in the Mediterranean coast region (Kaska, 2001). Kuden (1989), It is determined that the periods below 7°C range from 180 to 900 h in some areas in the Mediterranean coast region. The aim of this study was to determine the chilling durations in the area of Silifke which has a big agricultural potential in Turkey, and to instruct the producers about selecting the cultivars for the orchards to be created by comparing the chilling durations of the area and the fruit varieties.

MATERIALS AND METHODS

In the months between September and April in 1975 to 2011, the total values of the hours below +7.2°C are regarded while estimating

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Table 1. The chilling durations between the years of 1975 to 2011 in Silifke area.

Years	Total hours of the period below +7.2°C
1975-1976	612
1976-1977	333
1977-1978	167
1978-1979	140
1979-1980	475
1980-1981	106
1981-1982	362
1982-1983	803
1983-1984	13
1984-1985	499
1985-1986	142
1986-1987	402
1987-1988	261
1988-1989	645
1989-1990	472
1990-1991	512
1991-1992	1006
1992-1993	805
1993-1994	90
1994-1995	295
1995-1996	271
1996-1997	267
1997-1998	134
1998-1999	62
1999-2000	453
2000-2001	94
2001-2002	366
2002-2003	541
2003-2004	374
2004-2005	425
2005-2006	375
2006-2007	365
2007-2008	582
2008-2009	218
2009-2010	138

Source: Anonymous (2011).

the chilling duration of the area (Kuden, 1989).

RESULTS AND DISCUSSION

Based on the temperature values taken from the Silifke meteorological records, the estimated chilling durations are given in Table 1. It is seen that big differences occured in terms of the chilling durations between the years (Table 1).

According to the research findings, 1991 to 1992, 1992 to 1993 and 1982 to 1983 winter periods are determined as the coldest terms (Table 1). In 1992, the sufficient chilling caused an increase in the total apricot and peach yield. So, Silifke apricot production was 1.199 tons, peach production was 2.300 tons in 1992 (Anonymous, 1995) (Table 2).

From the apricot varieties grown in Silifke and nearby villages, "Tokaloglu", "Sekerpare" having high chilling requirements and "Bebeco" which has a mid-chilling requirement (Table 4), do not yield economic fruits after warm winters. The type of "Precoce De Tyrinthe" which has a 550 h chilling requirement (Table 4) approximately gives poor yield in some years because of getting inadequate chilling. At the end of the adaptation studies on plenty of apricot cultivars to be dried, positive results were not obtained due to the high chilling requirements of these cultivars (Paydas and Kaska, 1995). In Silifke between 1998 to 1999, it was calculated that the total chilling duration is 62 h (Table 1). This low chilling amount was reflected to the tree yields and in 1999 apricot production decreased to 1000 tons, peach production decreased to 2000 tons in Silifke (Anonymous, 2003) (Table 3).

Kuden (1996) studied on the chilling requirements in Adana, Mersin and Antakya and reported that Mersin area has the shortest chilling duration. Kuden's findings (1996) show parallelism with the research results. In warm years, to get economical yield from the types of deciduous fruits having relatively high chilling requirement, it is important to use dormancy breaking agents (Kuden et al., 1995). In the areas of temperate zone fruits which have warm winters, some precautions must be taken to make economic fruit production:

1. It is necessary to select the variety having short-chilling requirements, especially for the middle seasons varieties cultivation.
2. It is necessary to estimate the values of cold unit (CU) and total hours of growth degree (THGD) for the fruit growing areas in the Mediterranean region and to draw coldness map for the whole coast line.
3. Evaporative cooling system is needed to be practiced in the style of top-sprinkler system in the orchards after trees have some chilling.
4. From the chemicals used in the dormancy breaking practices, Dinitro Ortho Cresol (DNOC) + mineral oil practice is needed to be made attentively when apical buds become fluff in the first days of February (Kuden,1989).

Conclusıon

Silifke district of Mersin is a rich centre in terms of agricultural product ranges. Average annual 10.429 tons temperate zone fruits have been grown in the area (Anonymous, 2011). The species which have been grown

Table 2. Apricot and peach production of Silifke and total tree numbers (1991 to 1993 years).

1991				1992			
Apricot		Peach		Apricot		Peach	
Production (tons)	Tree (pieces)	Production (tons)	Tree (pieces)	Production (tons)	Tree (pieces)	Production (tons)	Tree (pieces)
1.131	18.100	2.040	68.400	1.199	18.960	2.300	68.700

Table 3. Silifke apricot and peach production amounts and total tree numbers (1998-1999 years).

1998				1999			
Apricot		Peach		Apricot		Peach	
Production (tons)	Tree (pieces)	Production (tons)	Tree (pieces)	Production (tons)	Tree (pieces)	Production (tons)	Tree (pieces)
1.092	30.300	2.140	67.750	1.000	30.300	2.000	67.750

Table 4. Chilling requirements of some apricot varieties grown in Silifke area (Total hours of the period below +7.2°C).

Variety	Chilling requirement
Bebeco	600
Şekerpare	980
Precoce De Tyrinthe	550
Priana	150
Tokaloğlu	1229

Source: Kuden and Kaska (1993).

are apple, apricot, plum, peach, cherry, pear and quince. From the table "P.De Tyrinthe", "Bebeco" and "Ninfa" apricots, have been the most planted cultivars in recent years. Among these cultivars, "Ninfa" has a highly low chilling requirement and this is a very big advantage for Silifke. So, even after warm winters, fruits can be yielded with no problems from the "Ninfa" orchards. However, warm winters can cause low yield in the types of "P.De.Tyrinthe" and "Bebeco" which have medium-chilling requirement (Table 4). Inadequate chilling requirements is an important problem for subtropical regions as Silifke. Avoiding economical loss of producers, it is beneficial to pay attention to some practices:

1. Types of deciduous temperate zone fruits (apricot, plum, peach-nectarine, apple, pear, cherry and quince) and the cultivars which have longer chilling duration in the fruit orchards to be created than the chilling duration of the area should not be used.
2. Using dormancy breaking agents (Dormex, DNOC) should be promoted in the existing orchards created with the fruit varieties having long-chilling requirements.

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