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STUDY ON EFFECTS OF DIFFERENT BUNCH COVERS AND THINNING METHODS ON DATE BUNCH FADING DISORDER

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ABSTRACT

Date bunch fading disorder has caused heavy economic damage in the main date producing regions of Iran in recent years. It takes place during fruits changing from Khalal to Rutab stage. Sudden drop of air humidity along with high temperature and blowing hot and dry winds have important role on incidence and development of disorder. In this study, the effects of two horticultural management factors, including different thinning methods and bunch covers as regulators of environmental harmful conditions were studied as factorial experiment in randomized complete block design with 16 treatments and 4 replications on date palm cv. Mozafti, in Jiroft area, during 2002–2003 .The two years data were combined, analyzed and the means of treatments compared, using Duncan's test. The results showed significant difference among different treatments of bunch covers and thinning methods, although the effect of bunch covers was more important than thinning methods. The means of damage percentage in mat-like basket, Aluminum foil, wax and control (without cover) were determined 6.79, 10.62, 16.92 and 19.16 respectively. The means of damage percentage on treatments by cutting one third of inflorescence tip at pollination stage, cutting one third of inflorescence tip at pollination stage and again 10 percent of central strands at Kimiri stage, cutting one third of central strands at Kimiri stage and control were determined 8.32, 12.56, 13.2, and 19.4, respectively. Finally, cutting of inflorescence tip at pollination stage along with application of mat-like basket at early Khalal stage is recommended as the best treatment for reducing the date bunch fading disorder.

Key words: Horticultural management, mat-like basket, aluminum foil, wax, inflorescence thinning, date bunch fading disorder.

INTRODUCTION

Date bunch fading disorder has been one of the most important problems, which caused economic damage in Iran date plantation in recent years. It first has been reported from Kahnoudge area in Kerman province on Mozafti cultivar in 1989 and gradually distributed to the other main date producing provinces such as Hormozgan, Boushehr, Fars, Khuzestan and Sistan and Beluchestan (Pezhman, 2002). It often has been observed on soft and mid ripening cultivars such as Mozafti, Mordaseng, Kalotae, Barhee, Khasoui and etc (Karampour, 2001; Pezhman, 2002; Pezhman et al., 2004). It usually takes place during fruits changing from Khalal to Rutab stage. Sudden wilting of fruits, producing longitudinal necrotic strips on upper surface and some

times lower surface of main bunch stalk in some cultivars, are the most important symptoms of disorder (Fig. 1).

Due to high economic importance of this disorder, different studies have been done to identify of causal agent (or agents) and methods of its control in different location in recent years. Some of the results are as follows:

Several fungi species were isolated from infected bunches of different cultivars in different location, which among them *Thielaviopsis paradoxa* is considered to act as secondary agent for this disorder under the stressed environment (Karampour and Pezhman, 2002; Najafinia and Azadvar, 2002). Interfering of the other biotic agents such as bacteria, viruses, viroids and MLO on incidence or development of disorder has not been confirmed yet (Karampour, 2001). Sudden drop of air humidity (below 20%) accompanied with high temperature and blowing hot and dry winds have important role on incidence and development of this disorder (Pezhman, 2002; Pezhman et al., 2003). Application of any controlling method that lead to regulate or decrease the harmful effects of environmental stresses have had positive effects on reducing the disorder damage (Darini and Ezadi, 2001; Mirzaei, 2001; Pezhman et al., 2003). Intercropping with Alfalfa and Sorghum in infected date plantation has been reported effective in reducing the disorder damage (Darini and Ezadi, 2001). Covering of bunches with Aluminum foil and mate-like basket has been recommended for decreasing the disorder damage (Pezhman, 2002). The rate of damage is highly related to quality of horticultural management in infected date plantations and the rate of damage is not considerable in date plantation with desirable management (Mirzaei, 2001). In this study, the effects of two necessary horticultural management factors, including, different methods of thinning and different kinds of covers were studied on reducing disorder damage.

MATERIALS AND METHODS

This trial was carried out as factorial experiment with 2 factors in form of randomized complete block design with 4 replications in date plantation of Mozafti cultivar with history of two years prevalence of disorder in Jiroft area, duing 2002-2003.

Factor T (thinning methods) including:
T_1= Cutting 1/3 inflorescence tip at pollination stage
T_2= Cutting 1/3 inflorescence tip at pollination stage in addition to cutting 10 percent of central strands at Kimiri stage.
T_3= Cutting 1/3 of central strands of bunch at middle of Kimiri stage.
T_4= Control (with out thinning)

Factor B (bunch covers) including
b_1 = mat-like basket
b_2=Aluminum foil
b_3= wax
b_4= control (with out cover)

Pollination was done by same male pollen during April. Irrigation was done with 5-6 days interval. The covers were installed on bunches at early Khalal stage (Fig. 2).

At harvesting stage, 50 fruits from 4 bunches of each replication (each tree) were selected randomly and the number of healthy and infected fruits and finally the percentage(s) of damage were calculated. The two years data was combined, analyzed and the means of damage were compared using Duncan Multiple Range test.

RESULTS AND DISCUSSION

The mean damage percentages in different thinning methods viz, cutting one third of inflorescence tip at pollination stage, cutting one third of inflorescence tip at pollination stage in addition to cutting 10 percent of central strands in Kimiri stage, cutting one third of bunch tip at middle of Kimiri stage and control were 8.33, 12.56, 13.23 and 19.4 respectively (Table 2).

The mean damage percent in different kinds of bunch covers viz, mat-like basket, Aluminum foil, wax and control were 6.79, 10.84, 16.92 and 19.16 respectively (Table 1).

Based on the results, cutting one third of inflorescence tip at pollination stage along with covering bunch with mat-like basket with 1.56 percent damage was more effective than other treatments on reducing disorder damage (Table 3).

The results of this experiment confirmed the opinion, that the weather fluctuations especially sudden drop of air humidity along with high temperature and blowing hot and dry winds have important role on incidence and development the disorder. Using suitable bunch cover, such as mat-like baskets protect bunches against harmful effects of hot and dry winds, sun burn, by reducing transpiration rate from bunches and decrease temperature within bunches. Also mat-like basket has other advantages like cheapness, easy availability, long-term usability, improvement in the quality of fruits and prevents pests' damage such as fruit borer, bees and birds. Thinning of bunches is an essential operation for producing commercial date for export, it produce fruits with high quality and more marketable characters by increasing the size of fruits, improve the skin color and fruit shape. Thinning of bunch reduces the transpiration rate and competition among fruits for up taking mineral nutrition and water. Pezhman et al. (2004) recommended the mat-like basket and thinning one third of inflorescence tip as the best treatment for reducing disorder damage in Khasoui cultivar in Khuzestan and Kabkab cultivar in Bousheher. Pezhman et al. (2003) also reported that using mat-like basket bunch cover reduced the daily mean temperature about 4.3˚C in a bunch compared to bunch without cover.

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TABLES

Table 1: Effect of bunch covers on the date bunch fading disorder (%age)

Mean	**b_4**	**b_3**	**b_2**	**b_1**	**Year**
13.26A	20.7a	16.97ab	5.88b	9.5ab	1
13.6A	17.63a	16.88a	7.7b	12.19ab	2
	19.16A	16.92A	6.79B	10.84AB	Mean

* Mean in each column with same letters are not significantly different (*P<0.05*).

Table2: Effect inflorescence thinning methods on the date bunch fading disorder (%age)

Mean	**T_4**	**T_3**	**T_2**	**T_1**	**Year**
13.16A	19.11a	12.58a	11.49a	9.48a	1
13.59A	19.69a	13.89ab	13.63b	7.18b	2
	19.4A	13.23AB	12.56AB	8.33B	Mean

* Mean in each column with same letters are not significantly different (*P<0.05*).

Table 3: Combined effect of bunch covers and inflorescence thinning methods on date bunch fading disorder (%age)

Kind of thinning	**Kind of cover**				
	b_1	**b_2**	**b_3**	**b_4**	**Mean (%)**
T_1	4.12b	1.56b	17.81ab	9.7b	8.29B
T_2	9.85b	8.25b	14.06ab	20.31ab	13.11AB
T_3	13.43ab	7.91b	15.4ab	19.37ab	14.02AB
T_4	15.18ab	9.43b	20.41ab	32.5a	19.38A
Mean (%)	10.64AB	6.78B	16.92AB	20.47A	

* Mean in each column with same letter are not significantly different (*P<0.05*)

FIGURES

a- Necrotic strips on main bunch stalk **b-** Wilting of fruits in Mozafati cultivar

Figure 1: Symptoms of date bunch fading disorder

a- Mat-like basket **b-** Aluminum foil

Figure 2: Installation of bunch covers