

Evaluation of the effects of bunch thinning methods on drying blossom of date palm disorder in two stages of pollination and kimri.

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ABSTRACT: Drying blossom of Date Palm (*Phoenix dactylifera* L.) disorder has become an important problem in production of date fruit in Iran since recent years. This experiment was conducted to evaluate the effects of time and the procedures of thinning. A RCBD with split plots in 4 replicates was used. 2 times of thinning (A1- pollination stage, A2- early of kimri stage) and 5 thinning methods (B1-control, B2- 10% removal of bunch tip, B3- 30% removal of bunch tip, B4-10% removal of central strands, B5- 30% removal of central strands. 40 palm trees with nearly same age and height were selected in Azizabad-Bam Research station and ratio of leaves to bunches was determined in each of them. Data was statistically analyzed using SAS software and means were compared using Multi range Duncan's Test ($\alpha=5\%$). With appearance of dried strands on date palm recording the rate of damage was began and ended up until the end of harvesting period. According to the results of analysis of variance, strand thinning showed an important role in reduction of damage and caused by date of strand drying problem. The role of thinning on yield with treatment as 10% removal of bunch tip and treatment as 10% removal of central strands were classified in class A. Time and thinning methods interaction on yield, treatment as 10% removal of bunch tip in Kimri stage with 10% removal of strands in pollination stage were classified in class A and showed no differences.

Keywords: *Phoenix dactylifera* L., Drying blossom, Thinning, Iran.

INTRODUCTION

Drying blossom of Date Palm disorder has become the most important problem for Iranian date producers since recent years. Nowadays, in Kerman, Hormozgan, Khuzestan, Bushehr provinces and some regions of Fars province, commercial and dominant date cultivars (such as Mazafati in Kerman, Mordaseng in Hormozgan, Kabkab in Bushehr, Khasi, Kabkab and Esta'meran in Khuzestan) have been highly damaged (Marashi & Pezhman, 2003). This disorder has no visual symptoms on root, trunk and leaves of infected palm trees. The obvious symptoms are fruits and strands drying. It coincides with changing fruit from Khalal to Rotab stage. In some regions, such as Azizabad-Bam, brownish and necrotic strands are observed on upper surface of peduncle of Mazafati cultivar that spreads rapidly. Numerous investigations have been conducted to know causes of the disorder and decreasing its damage.

Upon studies in Jiroft Agricultural Research Center, no phytoplasmic and bacterial pathogens has been found to cause this disorder (Azadvar, 2001). Upon to Panahi this disorder is intensifying when plant faced sudden and high environmental stress due to high weather temperature. He concluded that Ca deficiency might be having a role in increasing of this disorder (Pezhman, 2001).

Results of intercropping Sorghum and Alfalfa among palm trees in two regions of Bushehr and Jiroft areas indicated that intercropping (especially with sorghum) had a considerable role in decreasing damage of the disorder (Dareni, 2001). In Hormozgan province, factors of long irrigation intervals, high pests' population, intercropping system, orchards with various palm cultivars and wind direction from east to west had positive effect and late-ripening cultivars, tall trees, mountainous regions than warm and dry regions and heavy soil had negative effect on intensity of the disorder (Saei, 2001).

In studying the effect of thinning methods and type of coverage on palm strand drying disorder, effect of thinning, as a managing factor was more significant than covering, therefore thinning was known as more basic and important action to decrease damage symptoms (Mara'shi & Pezhman, 2003).

This research was conducted to study the effects of various methods and time of bunch thinning as an important managing factor on drying blossom of date Palm disorder.

MATERIALS AND METHODS

A RCBD with split plots in 4 replicates was used. 2 times of thinning (A1- pollination stage, A2- early of kimri stage) and 5 thinning methods (B1-control, B2- 10% removal of bunch tip, B3- 30% removal of bunch tip, B4- 10% removal of central strands, B5- 30% removal of central strands. 40 palm trees of Mazafati cultivar with nearly same age and height were selected in orchard of Aziz Abad's agricultural research station in Bam area, Kerman province, Iran. The orchard was situated 670 m above sea level and ratio of leaves to strands was determined in each of them. Data was statistically analyzed using SAS software and means were compared using Multi range Duncan's Test ($\alpha=5\%$).

DISCUSSION RESULTS & RESULTS

Results of ANOVA

Results show that effect of thinning on drying blossom of date Palm disorder was statistically significant ($\alpha=1\%$), but time of thinning had no significant effect on decreasing the losses. Results also show that effect of thinning on date yield was significant ($\alpha=5\%$).

Table 1. ANOVA of measured attributes

	d.f.	Mean square	
		Yield (kg/tree)	Percent of damage
Sov	3	ns 81.039	* 409.431
Replication	1	0.130 ^{ns}	ns 21.72
Thinning time	3	138.832	35.33
Error	4	224.465*	** 1558.53
Way of thinning	4	77.789 ^{ns}	53.28
Way of thinning× Thinning time	24	68.677	63.11
Error	(%)CV	25.37	25.67

Effect of various thinning treatments on drying blossom of date Palm disorder

Upon the table of mean classification, the highest percent of drying blossom disorder was observed in control with 41.36% (class A). Other treatments grouped in class B and C. It shows that thinning considerably decreased the losses compared with not thinned.

Effect of interaction of time and methods of thinning on drying blossom of date Palm disorder

Considering the table of mean classification, the highest loss was observed in control treatments in both thinning time (A1B1 and A2B1 with 41.36 %) and thus grouped as first (class A). The lowest loss was observed in treatment A2B5 with 3.54% (30% removal of central strands in early of Kimri phase).

Effect of methods of thinning on date yield per tree

Regarding table of mean comparison, 10% removal of bunch tip and central strands (treatments B2:22.38 kg/tree and B4:22.81 kg/tree) had the highest date yield per tree and placed in class A ($\alpha=5\%$). Control (treatment B1: 12.97 kg/tree) and (treatment B5:12.06) 30% removal of central strand) produced the lowest date yield per tree and placed in class BC and C ($\alpha=5\%$).

Effect of interaction of time and methods of thinning on date yield per tree

Upon table of mean classification, 10% removal of bunch tip in Kimri phase and from center of strand in pollination phase (treatments A1B4:26.66 kg/tree and A2B2:26.9 kg/tree) had same effect on date yield per tree.

Most trees produce more fruits than their capability that causes tree weakness, gradually. In such situation some fruits fall down before ripening (Rohani, 1988). Commonly most of date producers thin dates to prevent alternate bearing and to be sure of good yield in next year, world widely. Date fruit thinning permit the tree to have a regulated yield every year (Zaid, 1999).

The table of ANOVA shows that thinning had a considerable effect on decreasing the loss of palm strand withering and drying phenomenon that is the same as resulted by Mara'shi and Pezhman in Khuzestan

(2003). Izadi reported that thinning caused significant decreases ($\alpha = 0.05$) in fading disorder in experimental cultivars (2010).

Studying the effect of thinning on date yield showed that 10% removal of central strands or bunch tip increased date yield per tree. Tavakoli studied the effect of thinning in Shahani palm cultivar and concluded fruit thinning would increase size and quality of fruit (2002).

Table of effect interaction of time and methods of thinning on date strand withering and drying phenomenon showed that 30% removal of central strands in early Kimri phase (treatment A2B5:3.54%) was the best.

Studying the interaction of time and methods of thinning on date yield per tree showed that 10% removal of bunch tip in Kimri phase and 10% removal of central strands in pollination phase (treatments A1B4 and A2B2) were the best and grouped in class A.

Although by more thinning, loss decreased more but regarding date yield that is an important factor for date producers, 10% removal of strands is more recommendable, economically. In the other hand, thinning in pollinating phase needs fewer labors than thinning in Kimri phase. It is more recommendable due to its less cost; because one worker can thin date strands and pollinates palm flowers concurrently. Reports from Jiroft area showed that concurrent thinning and pollinating as a managing factor decreased losses of this disorder (Saei, 2001).

Table 2. The effect of treatments on yield and percent of damage

Treatment	Yield (kg/tree)		Percent of damage	
B1	12.97	BC12.97	A	41.36
B2	A	22.38	B	17.25
B3	AB	21.11	BC	10.81
B4	A	22.81	BC	10.63
B5	C	12.06	C	6.64

Table 3. The effect of interaction of yield \times Percent of damage

Treatment	Yield (kg/tree)		Percent of damage	
A1B1	B	11.72		41.36A
A1B2	AB	17.86		16.53B
A1B3	AB	21.30		6.93BC
A1B4	A	26.66		8.708BC
A1B5	A	13.49		9.750BC
A2B1	AB	14.22		41.36A
A2B2	A	26.9		18.51B
A2B3	AB	20.9		14.69 B
A2B4	AB	18.95		12.55 BC
A2B5	B	10.62		3.54 C

REFERENCES

- Azadvar M. 2001. Study the possibility of intervention of phytoplasmic and bacterial pathogens in date strand drying phenomenon. Center of Agricultural Research of Jiroft – Iran. 7 pp.
- Azadvar M. 2001. Study the probability of intervention of viral and viroidal pathogens in date strand drying phenomenon. Center of Agricultural Research of Jiroft – Iran. 7 pp.
- Damankeshan B. 2009. Evaluation of the effects of strand thinning methods on date strands withering problem in two stages of pollination and Kimri. Kerman's Agriculture and Natural Resources Research Center - Iran. 45 pp.
- Dareni A. 2001. Study effects of time and type of coverage of strands on preventing or decreasing the probable losses of date strand drying phenomenon. Center of Agricultural Research of Jiroft – Iran. 7 pp.
- Izadi M, Poozesh shirazi M, Davoodian A, Damankeshan B. 2010. Effects of bunch thinning methods on date bunch fading at pollination and Kimri stages. Fourth international date palm conference. Abu Dhabi; 15-17 March.
- Mara'shi S, Pezhman H. 2003. Study the effects of method of thinning and type of coverage on date strand drying phenomenon. Date Palm & Tropical Research Institute- Iran. 39 pp.
- Pezhman H. 2001. Palm cropping guidance (planting, maintenance and harvesting). Publication of agricultural education. 266 pp.
- Rohani I.1988. Date. Center of publication of Tehran University. 192 pp.
- Saei M. 2001. Study the effect of palm orchard managing factors on hardness of date strand drying phenomenon. Center of Agricultural Research of Jiroft – Iran. 7 pp.
- Tavakoli A. 2002. Comparison of hand and chemical thinning on quality and quantity of fruit yield and alternate bearing in date palm cultivar Shahani. M.Sc. Dissertation Dept. Horticulture. Shiraz University, Iran. 113 pp.
- Zaid A. 1999. Date palm cultivation. FAO Plant production and protection paper no 156. 287 pp.