

# **Receptivity of Pistilate Flowers of Mishrig Wad Laggai Date Palm Grown under Khartoum Conditions**

Dawoud H. Dawoud and Fatima A. Ahmed<sup>1</sup>

## **Abstract**

This experiment was conducted at ALHalfaia in a private-owned Date Palm Orchard in 1999, 2000 and 2001. Forty-five date palms of Mishrig Wad Laggai (MWL) cultivar were selected and subjected to five treatments in an RCBD. To determine the optimum length of time during which the female flowers of Mishrig Wad Laggai date palm remain receptive to fertilization which is considered an important practice in date production. The palms were pollinated after one, three, six, nine and twelve days from spathe cracking. Delaying pollination to sixth, ninth and twelfth day of female spathe cracking significantly reduced bunch weight by 27%, 43% and 51%, respectively, as compared to bunch weight obtained by pollination during the first day after spathe cracking. The study revealed that flowers which remain receptive six days after spathe cracking give the best yield and fruit quality.

## **Introduction**

Mishrig Wad Laggai (MWL) is the most popular semi soft variety grown commercially in the Sudan (Mason, 1925; Nixon, 1967). This cultivar was introduced early in the eighteenth century from EL Higaz by Mohamed Laggai and planted firstly at Abu Hamed area (Yousif 1995). Little research had been carried on this cultivar to improve the traditional pollination practices. The main objective of this study is to evaluate the length of time during which the female flowers of Mishrig Wad Laggai date palm remain receptive to fertilization.

## **Materials and Methods**

The present study was carried out at AL Halfaia (private orchard) on Mishrig Wad Laggai (MWL) date palms planted in 1982 on heavy clay soil. This experiment was conducted during 1999, 2000 and 2001 on 45 uniform, vigorous palms bearing the same number of spathes. An RCBD with five treatments and three replications was used for the experiment. Spathes were bagged singly prior to cracking and remained covered for four weeks to avoid external contamination with pollen.

The palms received the same cultural practices with only 15 bunches on each palm. Pollen from a single male was used for pollination in three seasons. All bunches were harvested on the first of September. Bunch weight was recorded and 25 fruits were picked at random from each bunch for the determination of physiochemical fruit properties. Sugars were determined according to the method of land and Eynon outlined in AOAC (1975).

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<sup>1</sup> Shambat Research Station

Data were statistically analysed and the difference between treatment means were compared using LSD (Snedecor and Cochran 1972).

## **Results and Discussion**

Tables 1 and 2 summarized the data on the effect of pollination after different days of female spathe cracking on the yield and fruit quality of MWL cultivar for 1999, 2000 and 2001 seasons.

### **Average yield per bunch**

Data in Table 1 indicated that for the three seasons the average bunch weight was not significantly affected if pollination took place either on the first or third day of female spathe cracking. Delaying pollination to sixth, ninth and twelfth day of spathe cracking resulted in a significant reduction in the average weight per bunch. These reductions were estimated in 1999 to be 27%, 43% and 51%, respectively in comparison to bunch weight obtained after pollination during the first day of female spathe cracking. Also the same results obtained during the other seasons of the experiment in 2000, when the reduction was 27% for the sixth day, 41% for ninth day and 63% for the 12<sup>th</sup> day of the spathe cracking. In 2001 season the reduction were 23% for sixth day, 39% for the ninth day and 57% for the 12<sup>th</sup> day of spathe cracking. This could be attributed to poor fruit setting as a result of delaying pollination. These results are in line with Reuveni (1970) and Marie (1971). They reported that the length of time during which the female flowers of date palm remain receptive varied according to variety, temperature and humidity during flowering period.

In general the percentage of fruit set decreased significantly when pollination was delayed after the third or fourth day of female spathe cracking. Moderate temperature with more humidity might increase such period to eight and tenth day of spathe cracking. Marie (1971) reported that the percentage of fruit setting of some varieties of dry dates decreased by 25% when pollination was delayed to the beginning of the second week of spathe cracking, such finding confirm the present results of MWL semi soft variety.

In contrast to the bunch weight, the size of individual fruit increased with delaying pollination to sixth, ninth and twelfth day of spathe cracking in season 1999 by 11%, 31.9% and 41.8%, in season 2000 by 13%, 21.7% and 32.6% and in season 2001 by 13.6%, 23.9% and 47.7%, respectively. Such an increase fruit weight had been found advantageous with regard to fruit quality. These findings are in line with EL Kassas (1983). Accordingly the fresh weight per fruit was significantly increased when pollinations was performed after the sixth or ninth day of spathe cracking (1999, 2000 and 2001) as compared to pollination in the first three days of spathe cracking. This might be due to the effect of delaying pollination on lowering fruit set and consequently, reducing the bunch weight all other physical characters (fruit weight, fruit volume and pulp weight) increased significantly due to delaying pollination.

### **Sugar contents**

The reducing sugars contents increased significantly as pollination was delayed to the twelfth day of spathe cracking in 1999, 2000 and 2001. This might be due to reduction in bunch weight. The non-reducing sugar decreased gradually by delaying

pollination also these result might be due to poor fruit setting and reduction in bunch weight. Thus more enhancements towards soft stage of fruit maturation might be responsible for reduction in non-reducing sugars. Total sugars contents were not affected significantly with pollination treatments in the three seasons. These results were in line with Hussein (1983), Teuveni (1970) and AL-Baker (1972).

## Recommendations

Under Khartoum conditions, pollinations of MWL palms should not be delayed beyond three days after spathe cracking which gives better yields of reasonable fruit quality.

## References

- AL-Baker, A. (1972). The Date palm. AL-Ani Press Baghdad. Iraq.
- Association of Official Agricultural Chemists 1975. Official Methods of Analysis A.O.A.C 12<sup>th</sup> Ed. A.O.A.C USA.
- EL-Kassas. Sh. E. (1983). Manual bunch and chemical thinning of Zagloul dates. Assiut. J. Agric. Sci. 14(2): 221.233.
- Hussein, F. M.S. AL-Kahtani and Y. A. Wally (1979). Date Cultivation and Production in both Arab and Islamic Nations Egyptian Horticulture Society. Ain shams Univ. Press. Cairo.
- Hussein F. (1992). Pollination of date palm and its effect on production and quality of fruits Proc. First Sump. on Date Palm in Saudi Arabia (1): 14-24.
- Laiding. A. R. (1928) Determination of length of time during which the flowers of date palm remain receptive to fertilization. J. Agric. Res. 36: 129-134.
- Marie. H. 1971. Date palm and dare products in Saudi Arabia. Min. Agric. & Water, Kingdom of Saudi Arabia.
- Mason, S. C. (1928). Date culture in the Sudan Khartoum Department Agr. And Forests. Unnumb Rpt. 79 pp. London.
- Nixon, R. W. (1987). Possibilities for improving date culture in the Sudan Inf. Prod. Center Khartoum. Sudan.
- Reveni, O. (1970). Pistil receptivity of Khadrawi. Zahdi and Deglet Noor date flowers. Date Growers' inst. Rep. 47: 3-4.
- Snedecor, G. W. and V. C. Coctran (1972). Statistical Methods 6<sup>th</sup> Ed. The Iowa State Univ. Press. Ames. USA.
- عبد الله احمد يوسف (1995) النخيل – الجزء الأول تحقيق دكتور/ محمد إبراهيم أبو سليم – دار جامعة الخرطوم للنشر .

**Table 1. Yield per bunch and physical characteristics of fruits of Mishrig Wad Laggai as influenced by pollination at different days of female spathe cracking.**

Treatments	Bunch weight kg			Fruit weight g/fruit			Fruit volume cc/fruit			Seed weight (g)			Pulp weight (g)		
	99	2000	2001	99	2000	2001	99	2000	2001	99	2000	2001	99	2000	2001
First day	17.9	24.3	21	9.1	9.2	8.8	18	10	14	1.51	1.54	1.52	7.6	7.7	7.3
Third day	16.8	23.5	20.1	9.3	9.4	8.9	18.7	11.8	15.3	1.49	1.50	1.47	7.5	7.9	7.4
Sixth day	13.1	18	16.2	10.1	10.4	10.0	20.8	13.2	17	1.52	1.51	1.50	8.6	8.9	8.5
Ninth day	10.2	14.6	13	12	11.2	10.9	21.3	14.1	17.5	1.50	1.52	1.50	10.5	9.7	9.4
Twelfth day	8.7	9.3	9	12.9	12.2	13	21.4	18.1	19.6	1.52	1.51	1.52	11.4	10.7	11.5
LSD, 5%	2.8	3.4	3.2	2.1	3.8	3.4	3.2	2.4	2.9	NS	NS	NS	2.2	2.8	2.4
S.E.	1.2	1.4	1.3	0.18	0.2	.27	1.66	1.2	1.5	0.00	0.00	0.00	1.7	1.9	1.5
C.V.	17.9	18.7	18.2	3.8	4.1	4.8	22.3	16.2	13.1	0.82	0.41	0.64	4.4	4.9	4.7

**Table 2. Sugars contents of Mishrig Wad Laggai fruits as influenced by pollination at different days of female spathe cracking**

Treatments	Reducing Sugars %			Non Reducing Sugars %			Total Sugars %		
	99	2000	2001	99	2000	2001	99	2000	2001
First day	14.14	12.7	13.8	10.6	8.4	9.5	24.8	21.2	22.4
Third day	15.8	13.14	14.1	10.6	8.4	9.4	26.4	21.8	24.3
Sixth day	15.3	13.14	14.8	8.9	8.2	8.7	24.7	21.4	22.3
Ninth day	16.32	14.1	15.0	8.2	7.1	8.4	24.5	21.2	22.4
Twelfth day	16.35	14.2	15.0	8.2	7.2	8.4	24.5	21.2	22.3
LSD, 5%	1.49	1.14	1.8	1.12	1.00	0.94	NS	NS	NS
S.E.	0.5	0.59	0.47	0.39	0.27	0.41	-	-	-
C.V.	8.2	8.9	8.0	10.1	11.0	10.2			