

## The Effect of Different Leaf/Bunch Ratios on Yield and Fruit Quality of Nebut Seif and Ruzeizi Date Palm Cultivars

Mohamed A. Bacha and Mohamed A. Shaheen

Department of Plant Production, College of Agriculture,  
King Saud University, Riyadh, Saudi Arabia.

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**ABSTRACT.** The effect of leaf/bunch ratios (5, 7 and 9 leaves/bunch) on yield and fruit quality of Nebut Seif and Ruzeizi date palm cultivars was studied for 3 successive years. Yield and average bunch weight gradually increased with increasing leaf/bunch ratio in both cultivars. Leaf/bunch ratio had a slight effect on physical quality of the fruit and a significant effect on total soluble solids (TSS). Moisture content of fruit at rutab stage increased with increasing leaf/bunch ratio, though the differences between treatments were not significant.

In pruning date palms, the importance of leaving a sufficient number of fully expanded green leaves per bunch to obtain high yields of fruit of good quality has been emphasized by several investigators. Nixon (1940, 1947, 1957) reported that an average of 7.5 leaves/bunch of the Deglet Noor Cultivar was needed to obtain high yields of fruit of good quality and to assure the production of an adequate number of bunches the following year. Hussein and Abdalla (1973) found that a 9 leaves/bunch was most suitable for Sakkoti cultivar. Abdulla *et al.* (1982) stated that increment in the leaf/bunch ratio in Hayany cultivar influenced yield and all fruit properties except for titratable acidity, tannins and crude fiber. Although, Hussein *et al.* (1977) reported that 12 leaves/bunch was sufficient to obtain a suitable yield of good quality fruits in Barhi cultivar under Qassim conditions but nevertheless, these effects are not widely investigated under the conditions of Saudi Arabia.

Therefore, the present experiment was carried out at Dirab Experiment Station, College of Agriculture, King Saud University to study the effect of

different leaf/bunch ratios on yield and fruit quality in Nebut Seif and Ruzeizi date palm cultivars.

### Material and Methods

This investigation was conducted during 1981, 1982, and 1983. Twelve Nebut Seif and 9 Ruzeizi trees, 12 years old at the start of the experiment and of similar vigor, were used. Cultural practices, *i.e.*, pollination from a single tree, fertilization, irrigation, ...etc., were uniform during the study. Three treatments were applied to 4 single tree replicates of Nebut Seif and to 3 single tree replicates of Ruzeizi. Both leaves and bunches were pruned to attain a definite leaf/bunch ratio. The treatments were as follows:

*Treatment A.* 5:1 leaf/bunch ratio,

*Treatment B.* 7:1 leaf/bunch ratio,

*Treatment C.* 9:1 leaf/bunch ratio.

The number of bunches left on each palm was 6 and 4 bunches, respectively, in Nebut Seif and Ruzeizi cultivars. The above treatments were applied at pollination time. The oldest leaves were removed in pruning.

At harvest time, (August 30 in 1981, September 6 in 1982 and September 4 in 1983), the yield was determined as total fruit weight in Kg. Bunch weight was also determined in each palm. Samples of 100 fruits (at rutab stage) were taken from each palm for physical and chemical characteristics determinations. The physical characteristics included; fruit weight, volume, diameter and length. The chemical characteristics included; total soluble solids (TSS) and moisture content. Total soluble solids was determined by Abbe refractometer. Moisture content was determined by drying 100 g of the fruit flesh at 70°C till constant weight (A.O.A.C. 1970).

### Results and Discussion

#### *Effect of leaf/bunch ratio on:*

##### *a. Yield and bunch weight:*

Data of the present study showed that yield of Nebut Seif and Ruzeizi date palm cultivars increased gradually with increasing the leaf/bunch ratio in the three years of the experiment (Fig. 1). However, the differences between the three treatments were not always statistically significant in both cultivars. These results are in general agreement with those obtained by Nixon (1940, 1947 and 1957), Hussein and Abdalla (1973), Hussein *et al.* (1977) and Abdulla *et al.* (1982) working on different date palm cultivars.

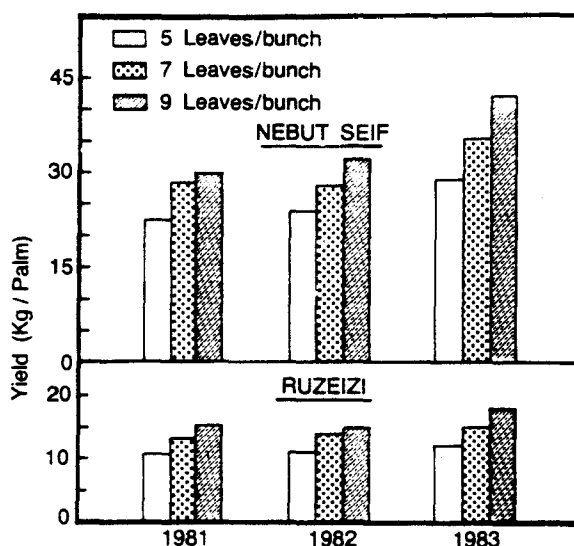


Fig. 1. Effect of Leaf/bunch ratio on yield of Nebut Seif and Ruzeizi date palm cultivars in 1981, 1982 and 1983 seasons.

Regarding the bunch weight, the data indicated that the highest bunch weights were obtained from treatment (C) with 9:1 leaf/bunch ratio in both cultivars (Fig. 2). However, the differences between the treatments were not statistically significant except that in 1982 and 1983 seasons for Nebut Seif cv. and in 1983 season for Ruzeizi cv. Similar trend of results was obtained by Hussein and Abdalla (1973) on Sakkoti cv. in Egypt and Hussein *et al.* (1977) on Barhi cv. in Saudi Arabia. On the other hand, Miremedi (1971) reported that there was no exact relationship between weight of bunches and the leaf/bunch ratio in some Persian date palm cultivars.

#### b. Fruit characteristics:

The results of the present experiment revealed that physical characteristics of the fruit (*i.e.* weight, volume, diameter and length) increased gradually with increasing the leaf/bunch ratio in both cultivars (Table 1). The differences between the three treatments of leaf/bunch ratios were not statistically significant except that, in 1983, for Ruzeizi cv., fruit, weight, volume and length in treatment A(5:1) were significantly lower than in the other two treatments (Table 1). These findings are in line with those of Hussein and Abdalla (1973), Hussein *et al.* (1977) and Abdulla *et al.* (1982).

With regard to chemical characteristics (TSS and moisture percentage), the

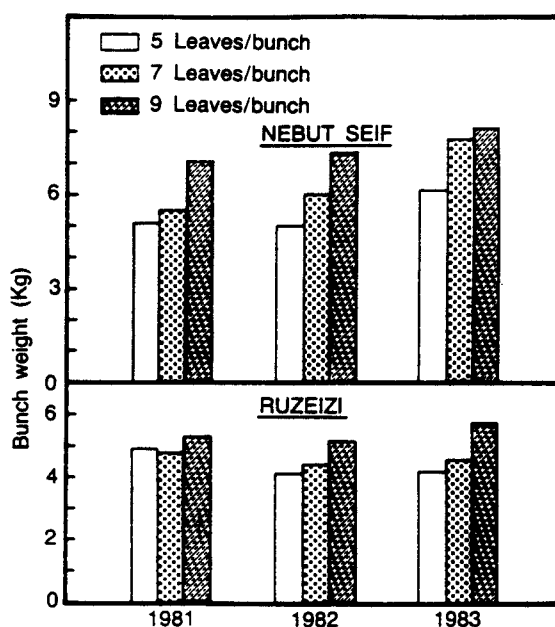


Fig. 2. Effect of Leaf/bunch ratio on bunch weight of Nebut Seif and Ruzeizi date palm cultivars in 1981, 1982 and 1983 seasons.

results followed somewhat similar trend (Table 1). In other words, TSS% was increased gradually with increasing the leaf/bunch ratio and treatment (C) always showed the highest TSS content as compared with the other two treatments in both cultivars. Significant differences were reached between treatment (A) 5:1 and treatment (C) 9:1 in 1982 and 1983 seasons in Nebut Seif cv. and in 1982 season in Ruzeizi cv. (Table 1).

Concerning moisture content of the fruits, the data showed that it increased gradually with increasing the leaf/bunch ratio though the differences were not statistically significant in both cultivars (Table 1). Similar trend of results was obtained on Barhi cv. by Hussein *et al.* (1977) and on Hayany cv. by Abdulla *et al.* (1982).

### Conclusions

It could be concluded from these foregoing experiments that increasing leaf/bunch ratio up to 9:1 resulted in increasing yield and improving fruit quality in both Nebut Seif and Ruzeizi cultivars. The effect of leaf/bunch ratios other than those mentioned above merits investigation in different date palm cultivars and in different growing regions in the Kingdom.

**Table 1.** Effect of leaf/bunch ratio on some physical and chemical characteristics of fruits of Nebut Seif and Ruzeizi date palm cultivars in 1981, 1982 and 1983.

Treatments: Leaf/bunch ratio	Fruit weight (g)	Fruit Volume (cc)	Fruit Diameter (cm)	Fruit Length (cm)	Fruit TSS (%)	Fruit Moisture (%)
<i>Nebut Seif 1981</i>						
(A) 5:1	14.29	12.80	2.73	3.73	64.62	13.76
(B) 7:1	15.63	13.83	2.78	3.80	66.38	14.20
(C) 9:1	15.95	14.05	2.82	3.74	68.37	14.70
L S D 5% 1%	NS	NS	NS	NS	NS	NS
<i>Ruzeizi (1981)</i>						
(A) 5:1	9.86	9.55	2.25	3.13	68.50	15.37
(B) 7:1	11.44	10.00	2.31	3.16	69.00	16.17
(C) 9:1	12.60	11.71	2.37	3.39	72.00	16.42
L S D 5% 1%	NS	NS	NS	NS	NS	NS
<i>Nebut Seif 1982</i>						
(A) 5:1	10.73	10.27	2.06	2.78	61.70	21.14
(B) 7:1	12.34	11.32	2.15	2.89	62.30	24.99
(C) 9:1	12.49	11.65	2.15	2.97	66.05	26.42
L S D 5% 1%	NS	NS	NS	NS	3.94 5.97	NS
<i>Ruzeizi (1982)</i>						
(A) 5:1	9.13	8.31	2.00	2.86	55.53	19.41
(B) 7:1	9.99	9.89	2.02	2.92	64.27	19.52
(C) 9:1	9.84	9.29	2.00	2.93	66.50	20.16
L S D 5% 1%	NS	NS	NS	NS	9.83 16.23	NS
<i>Nebut Seif 1983</i>						
(A) 5:1	11.51	9.15	2.46	3.00	69.40	26.73
(B) 7:1	12.82	10.03	2.57	3.06	70.18	27.32
(C) 9:1	13.44	10.80	2.62	3.20	72.25	27.50
L S D 5% 1%	NS	NS	NS	NS	2.92 4.41	NS
<i>Ruzeizi (1983)</i>						
(A) 5:1	7.98	6.97	2.05	2.53	69.35	26.57
(B) 7:1	10.53	8.80	2.18	3.16	70.80	27.41
(C) 9:1	10.69	9.23	2.24	3.19	71.20	27.74
L S D 5% 1%	1.89 3.13	1.02 1.69	NS	0.40 0.67	NS	NS

### References

- Abdulla, K.M., Meligi, M.A. and Risk, S.Y. (1982) Influence of crop load and leaf/bunch ratios on yield and fruit properties of Hayany dates. *Proc. 1st symposium on the date palm in Saudi Arabia*. March 23-25, 1982. Published by: King Faisal Univ. Al-Hassa, Saudi Arabia.

- Association of Official Agricultural Chemists (The AOAC) (1970).** *Official and Tentative Methods of Analysis* (11th ed.). Washington, D.C., U.S.A.
- Hussein, F. and Abdalla, K.M. (1973)** Leaf/bunch ratio in relation to yield, fruit quality and ripening of Sakkoti dates. *High Polytechnical Institute, Moshtohor, Egypt. Bull.* **33**: 1-12.
- , **Mostafa, S. and El-Kahtani, M. (1977)** Effect of leaves/bunch ratio on quality, yield and ripening of Barhi dates grown at Saudi Arabia. *Proc. 1st Agric. Conf. Muslim Scient.* Riyadh, Saudi Arabia. April 19-23, 1977. Vol. **3**: 409-419.
- Miremadi, A. (1971)** Principles of pruning in relation to fruit thinning. *Date Grower's Inst. Rep.* **48**: 9-11.
- Nixon, R.W. (1940)** Fruit thinning of dates in relation to size and quality. *Date Grower's Inst. Rep.* **17**: 27-29.
- Nixon, R.W. (1947)** Can a date palm carry too many leaves? *Date Grower's Inst., Rep.* **24**: 24-27.
- Nixon, R.W. (1957)** Effect of age and number of leaves on fruit production of the date palm. *Date Grower's Inst. Rep.* **34**: 21-24.

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## تأثير نسب مختلفة من الأوراق إلى العذوق على المحصول وخواص الثمار في صنف نخيل البلح نبوت سيف ورزيزي

محمد علي أحمد باشه ومحمد عبد الرحيم شاهين

قسم الإنتاج النباتي - كلية الزراعة - جامعة الملك سعود  
الرياض - المملكة العربية السعودية

درس تأثير ٣ معاملات من نسب الأوراق / العذوق (٥، ٧، ٩ أوراق / عذوق) على المحصول وخواص الثمار في صنف نخيل البلح نبوت سيف ورزيزي خلال ٣ سنوات متعاقبة.

وقد أوضحت نتائج هذه الدراسة أن المحصول ومتوسط وزن العذوق قد ازدادا تدريجياً بزيادة نسبة الأوراق / العذوق في كلا الصنفين، وكان لزيادة نسبة الأوراق / العذوق تأثيراً بسيطاً على الخواص الطبيعية للثمار، أما بالنسبة للصفات الكيميائية فقد أوضحت الدراسة أن نسبة المواد الصلبة الذائبة الكلية قد ازدادت بصورة مؤكدة إحصائياً بزيادة نسبة الأوراق / العذوق. كذلك ازدادت نسبة الرطوبة في الثمار ولكن بفروق غير مؤكدة إحصائياً.