J. Agric. Sci. Mansoura Univ., 32 (9): 7503 - 7512, 2007

DYNAMICS OF FLOWERING IN MATROUH ASWAD AND BLACK ROSE GRAPEVINE CULTIVARS

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ABSTRACT

Dynamics of flowering in the two grapevine cvs Matrouh Aswad and Black Rose growing under Nobaria conditions were investigated during 2000 and 2001 seasons.

The obtained results showed that percentage of flowering per day in grapevine cv. Matrouh Aswad increased gradually reaching its maximum in the third and seventh days in both seasons after which a sharp reduction occurred in the subsequent days. The maximum percentage of flowering per day in grapevine cv. Black Rose was presented in the sixth day in the first season and fourth day in the second one. The period of cluster flowering for Matrough Aswad was 7-9 days and for Black Rose was 7-8 days during the two seasons. Percentages of flowering per hour in both grapevine cvs were low at 8A.M then increased sharply attaining its maximum at 13 P.M. then tended to reduce at 14 P.M.

INTRODUCTION

Yield of all grapevine cvs is substantially affected by behaviour of flowering. Dynamics of flowering in most grapevine cvs acquires its importance from the fact that it is beneficial in determining the suitable time for carrying out some horticultural practices especially those connected with soil management. Dynamics of grapevines flowering studies in Egypt till now are rare. Previous studies showed that flowering period and flowering per hour were greatly varied under environmental conditions and different grapevine cvs (Winkler, 1974: Bessis, 1965; Fawzi 1974: fawzi et al., 1984; El-Helw-Hanaa & Gaser-Aisha, 2005 and Staudt 1999) .

The merit of this study was studying dynamics of flowering in two grapevine cvs namely Matrouh Aswad and Black Rose growing under Nobaria conditions.

MATERIALS AND METHODS

This investigation was initiated during 2000 and 2001 seasons in vineyard located at Horticultural Research Station, Nobaria region on two grapevine cvs Matrouh Aswad and Black Rose 10 years old, uniform in vigour, grown in sandy clay calcareous soil, cordon system spaced 2x3 m a part, irrigated by the surface irrigation system, and leaving 48 buds/vines . All vines received the same horticultural practices already applied in the vineyard. Six grapevines from each cv. were selected for achieving this study.

For carrying out this study 30 clusters borne on moderate growing shoots were chosen, taking into account that all sides of the vine were represented as possible. Factorial experiment within randomized completely block designed with six replications the data was transformed by Bollowing equation:

$$Y = \sqrt{X + \frac{1}{2}}$$

Y = Transformed data
X = actual data

As flowering peroide approached in both cvs., the work started on each cluster by gently picking up flowers that opened by means of a special forceps with the right hand, while putting the clusters in a horizontal position on the palm of the left hand. The picked flowers were counted every hour starting from 7 A.M till 2 P.M. The work continued till the end of flowering (when the clusters free from flowers). Percentage of flowering per hour was calculated by diving number of excised flowers at a given hour for all days of flowering by total number of picked flowers then multiplying the product by 100 and percentage of flowering per day was calculated by diving number of excised flowers in a given day by total number of flowers counted during the flowering period, then the product was multiplied by 100. Date was statistically analysed according to Sendecor and Cochran (1980).

RESULTS AND DISCUSSION

1. Dynamic of flowering in Matrouh Aswad grapevine cv.

1.1 Percentage of flowering per day

As shown in Tables (1,2) and Figure (1) percentage of flowering per day followed similar trend in both season of the study, regardless of some fluctuations caused by temperature and humidity prevailing during the flowering stage (Winkler, 1974) Percentage of flowering per day reached (As means) 0.29, 1.84, 2.61, 2.31, 2.32, 1.76 and 1.35 % on 3,4,5,6,7,8 and 9 May, respectively in the first season of study. While they were (As means) 0.51, 0.79, 1.01, 1.37, 2.11, 2.18, 2.53, 2.39 and 0.47% on 5,6,7,8.9.10,11,12 and 13 may, respectively in the second seasons .

There was a gradual increase in the percentage of flowering per day up to the third day from the start of flowering in the first season and up to the seventh day in the second season where it reached its peak. Thereafter, it exhibited a sharp decrease reaching its minimum at the end of flowering. Data also indicated that the period of floweing of the cluster was 7 and 9 days in the two seasons, respectively. Percentage of flowering in the second season was lower than the first one. This may be attributed to the fact that year characterized by highter flowering percentage is usually followed by a reduction in the subsequent season as mentioned by Bessis (1965).

Table (1) Dynamics of cluster flowering in Matrouh Aswad grapevine cv. During 2000 season.

Season 2000								
Percentage of flowering per days(actual means non transformed mean)								
Time	May 3	May 4	May 5	May 6	May 7	May 8	May 9	means
7 am	0	2.42	2.45	2.39	2.36	2.20	1.47	1.90
8 am	0	0.53	2.07	2.39	1.75	1.75	0.72	1.32
9 am	0	0.68	2.10	2.86	1.95	1.75	0.79	1.45
10 am	0	1.66	2.35	2.24	1.73	1.56	1.32	1.55
11 am	0	1.98	2.37	1.97	2.28	1.50	1.75	1.69
12 am	0	2.54	3.13	2.33	2.65	1.89	1.37	1.99
13pm	1.30	2.60	3.44	2.30	3.10	1.80	1.90	2.35
14pm	1.04	2.34	2.94	2.02	2.73	1.61	1.49	2.02
Means	0.29	1.84	2.61	2.31	2.32	1.76	1.35	1.78
Season 2000								
Percentage of flowering per days (transformed mean)								
Time	May 3	May 4	May 5	May 6	May 7	May 8	May 9	means
7 am	0.71	1.71	1.72	1.70	1.69	1.64	1.40	1.51
8 am	0.71	1.01	1.60	1.70	1.50	1.50	1.10	1.30
9 am	0.71	1.09	1.61	1.83	1.57	1.50	1.14	1.35
10 am	0.71	1.47	1.69	1.66	1.49	1.44	1.35	1.40
11 am	0.71	1.57	1.69	1.57	1.67	1.41	1.50	1.45
12 am	0.71	1.74	1.91	1.68	1.77	1.55	1.37	1.53
13pm	1.34	1.76	1.98	1.67	1.90	1.52	1.55	1.67
14pm	1.24	1.69	1.85	1.59	1.80	1.45	1.41	1.58
Means	0.85	1.51	1.76	1.68	1.67	1.50	1.35	1.47

L.S.d 0.05 Hrs 0.03
L.S.d 0.05 days 0.03
L.S.d 0.05 Interaction 0.09

Table (2) Dynamics of cluster flowering in Matrouh Aswad grapevine cv. During 2001 season.

Season 2001										
Percentage of flowering per days(actual means non transformed mean)										
Time	May 5	May 6	May 7	May 8	May 9	May 10	May 11	May 12	May 13	Means
7 am	0	0.44	0.24	0.51	1.46	2.23	2.30	2.38	1.30	1.21
8 am	0	0.11	0.18	0.29	0.88	1.03	1.26	1.03	0.59	0.60
9 am	0.19	0.26	0.37	0.43	1.46	1.30	1.75	2.09	0.72	0.95
10 am	0.23	0.77	0.41	1.41	2.02	1.55	2.32	2.61	0.74	1.34
11 am	0.63	0.80	1.14	1.91	2.59	2.18	2.75	2.86	0.42	1.70
12 am	0.76	1.34	1.99	2.44	2.87	2.86	3.26	2.85	0	2.04
13pm	1.32	1.40	2.28	2.19	2.99	3.21	3.33	2.93	0	2.18
14pm	0.91	1.23	1.45	1.75	2.63	3.05	3.23	2.37	0	1.85
	0.51	0.79	1.01	1.37	2.11	2.18	2.53	2.39	0.47	1.48
Season 2001										
Percentage of flowering per days (transformed mean)										
Time	May 5	May 6	May 7	May 8	May 9	May 10	May 11	May 12	May 13	Means
7 am	0.71	0.97	0.86	1.00	1.40	1.65	1.67	1.70	1.34	1.26
8 am	0.71	0.78	0.82	0.89	1.17	1.24	1.33	1.24	1.04	1.02
9 am	0.83	0.87	0.93	0.96	1.40	1.34	1.50	1.61	1.10	1.17
10 am	0.85	1.13	0.95	1.38	1.59	1.43	1.68	1.76	1.11	1.32
11 am	1.06	1.14	1.28	1.55	1.76	1.64	1.80	1.83	0.96	1.45
12 am	1.12	1.36	1.58	1.71	1.84	1.83	1.94	1.83	0.71	1.55
13pm	1.35	1.38	1.67	1.64	1.87	1.93	1.96	1.85	0.71	1.60
14pm	1.19	1.32	1.40	1.50	1.77	1.88	1.93	1.69	0.71	1.49
	0.98	1.12	1.19	1.33	1.60	1.62	1.73	1.69	0.96	1.36

L.S.d 0.05 Hrs 0.02
L.S.d 0.05 days 0.02
L.S.d 0.05 Interaction 0.05

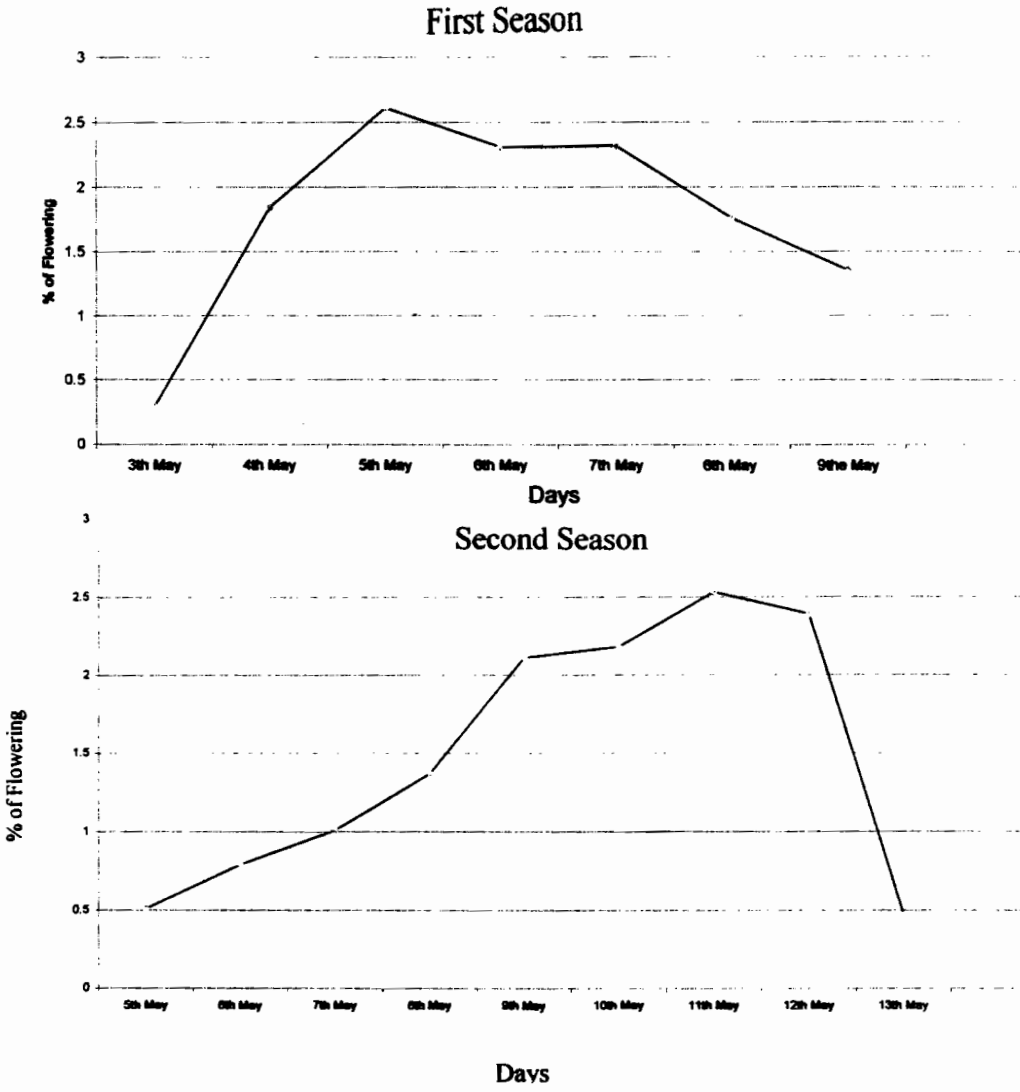


Fig. (1) : Percentage of flowering per day in Matrouh Aswad grapevine cv. During 2000 and 2001 seasons

1-2 Percentage of flowering per hour

As for percentage of flowering per hour, data illustrated in Tables (1,2) and Figure (2) indicate that such percentage was greatly varied among different times. It was increased progressively with advancing times of each day till 13 P.M., since it was maximum at 13 P.M in both seasons followed by a sharp decrease reaching. (As means 2.02 and 1.85%) at 14 P.M in 2000 and 2001 seasons respectively. The minimum values were found at 8 A.M (1.32 and 0.60 %) in both seasons respectively. The maximum values (2.35 and 2.18%) were recorded at 13 P.M and similar trend was detected in both seasons.

The highest percentage of flowering was recorded on May 5th at 13PM in the first season. However, in the second season the highest percentage of flowering was recorded on May 11th at 13 PM.

The least percentage of flowering was obtained on May 9th at 8. AM in the first season. However, in the second season the least percentage of flowering was obtained on May 6th at 8 AM.

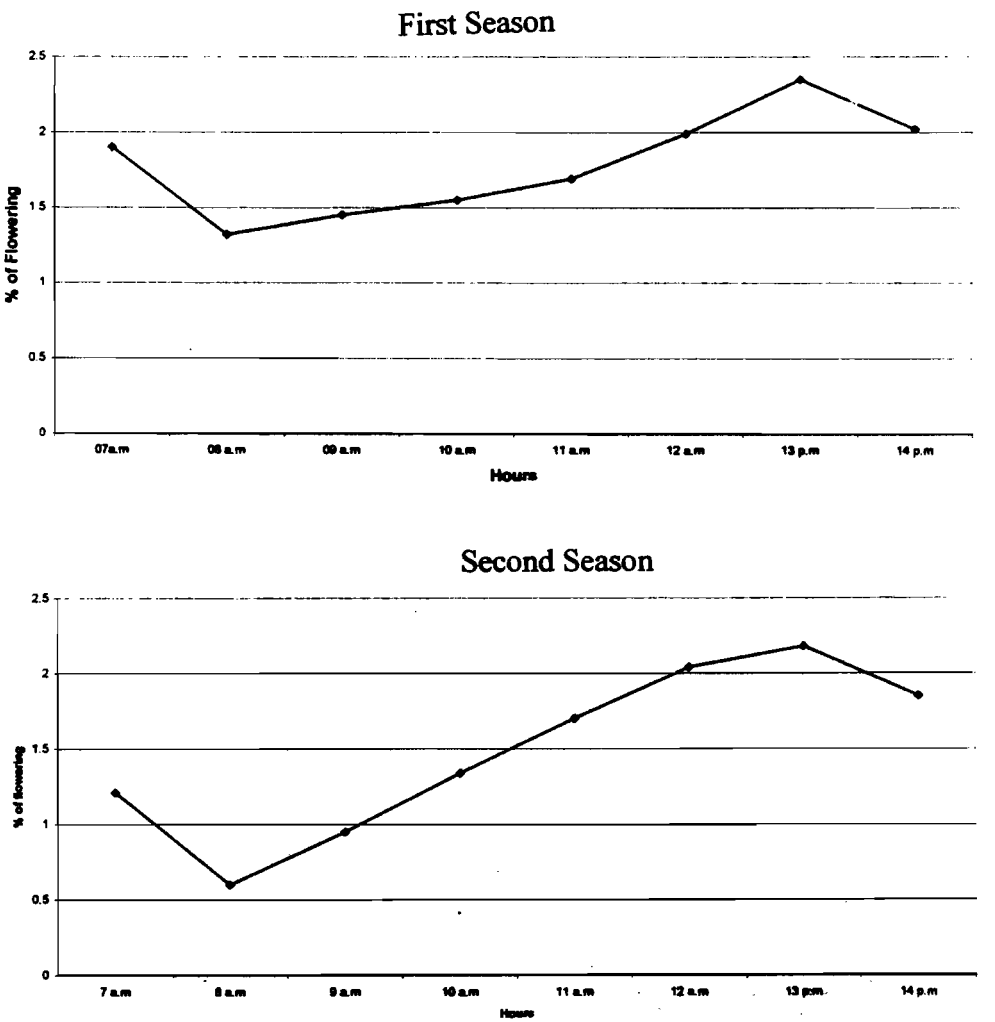


Fig. (2) : Percentage of flowering per hour in Matrough Aswad grapevine cv. Druring 2000 and 2001 seasons.

2. Dynamics of flowering in Black Rose grapeviene cv.

2-1 percentage of floweing per day

It is clear from the data in Tables (3,4) and Figure (3) that there was a gradual promotion in the percentage of flowering per day with advancing dates after flowering start in the first season of study. There were some fluctuations caused by temperature and humidity prevailing during the flowening stage (winkler 1974) Percentage of flowering per day reached (As means) 0.43, 0.96, 2.08, 2.21, 2.30, 2.62 and 2.57 on 10,11,12,13,14,15 and 16 May, respectively in the first season of study. While they were 1.42, 1.82, 1.94, 2.20, 2.08, 2.01, 1.52 and 0.25%on 12,13,14,15,16,17,18 and 19 May, respectively .

Table (3) Dynamics of cluster flowering in Black Rose grapevine cv. During 2000 season.

Season 2000								
Percentage of flowering per days(actual means non transformed mean)								
Time	May10	May11	May12	May13	May14	May15	May16	means
7 am	0	0.91	2.48	2.66	2.51	2.86	2.83	2.04
8 am	0.02	0.64	1.85	1.60	1.88	2.26	2.39	1.52
9 am	0.15	0.85	1.97	1.94	2.12	2.48	2.53	1.72
10 am	0.14	1.04	2.10	2.45	2.23	2.58	2.46	1.86
11 am	0.39	1.18	2.11	1.98	2.31	2.55	2.60	1.87
12 am	0.64	0.97	2.05	2.19	2.41	2.60	2.57	1.92
13pm	1.15	1.14	2.22	2.46	2.57	2.93	2.69	2.17
14pm	0.95	0.97	1.84	2.36	2.40	2.73	2.49	1.96
Means	0.43	0.96	2.08	2.21	2.30	2.62	2.57	1.88
Season 2000								
Percentage of flowering per days (transformed mean)								
Time	May10	May11	May12	May13	May14	May15	May16	means
7 am	0.71	1.19	1.73	1.78	1.73	1.83	1.82	1.54
8 am	0.72	1.07	1.53	1.45	1.54	1.66	1.70	1.38
9 am	0.81	1.16	1.57	1.56	1.62	1.73	1.74	1.46
10 am	0.80	1.24	1.61	1.72	1.65	1.75	1.72	1.50
11 am	0.94	1.30	1.62	1.57	1.68	1.75	1.76	1.52
12 am	1.07	1.21	1.60	1.64	1.71	1.76	1.75	1.53
13pm	1.28	1.28	1.65	1.72	1.75	1.85	1.79	1.62
14pm	1.20	1.21	1.53	1.69	1.70	1.80	1.73	1.55
Means	0.94	1.21	1.61	1.64	1.67	1.77	1.75	1.51

L.S.d	0.05 Hrs	0.01
L.S.d	0.05 days	0.01
L.S.d	0.05 Interaction	0.03

Percentage of flowering was gradually increased up to the sixth day in the first season and up to the fourth day in the second season, then tended to reduce sharply till the end of flowering stage. Flowering period of the cluster was found to be 7 and 8 days in both seasons, respectively. The maximum percentage of flowening per day was presented in the sixth day in the first season (2.62%) and the fourth day in the second season (2.20%).

The least values were recorded in the first day and the eighth day in the first and second seasons, respectively. There variations could be attributed to the effect of temperature and humidity prevailing during the flowering period as explained by Winkler (1974).

Table (4) Dynamics of cluster flowering in Black Rose grapevine cv. During 2001 season.

Season 2001									
Percentage of flowering per days(actual means non transformed mean)									
Time	May12	May13	May14	May15	May16	May17	May18	May19	Means
7 am	0.74	1.84	1.79	2.06	2.02	1.83	1.90	1.29	1.68
8 am	0.66	0.49	0.78	1.01	1.09	1.04	0.91	0.42	0.80
9 am	0.86	1.57	1.55	1.87	1.55	1.72	1.29	0.24	1.33
10 am	1.26	1.42	1.81	1.99	1.77	1.82	1.49	0.07	1.45
11 am	1.44	1.96	2.11	2.47	2.15	2.41	1.80	0	1.79
12 am	2.12	2.35	2.50	2.73	2.75	2.45	1.84	0	2.09
13pm	2.29	2.71	2.75	3.02	2.82	2.53	1.86	0	2.25
14pm	2.02	2.22	2.26	2.47	2.47	2.31	1.09	0	1.86
means	1.42	1.82	1.94	2.20	2.08	2.01	1.52	0.25	1.66
Season 2001									
Percentage of flowering per days(transformed mean)									
Time	**May12**	**May13**	**May14**	**May15**	**May16**	**May17**	**May18**	**May19**	**Means**
7 am	1.11	1.53	1.51	1.60	1.59	1.53	1.55	1.34	1.47
8 am	1.08	0.99	1.13	1.23	1.26	1.24	1.19	0.96	1.14
9 am	1.17	1.44	1.43	1.54	1.43	1.49	1.34	0.86	1.34
10 am	1.33	1.39	1.52	1.58	1.51	1.52	1.41	0.75	1.38
11 am	1.39	1.57	1.62	1.72	1.63	1.71	1.52	0.71	1.48
12 am	1.62	1.69	1.73	1.80	1.80	1.72	1.53	0.71	1.58
13pm	1.67	1.79	1.80	1.88	1.82	1.74	1.54	0.71	1.62
14pm	1.59	1.65	1.66	1.72	1.72	1.68	1.26	0.71	1.50
means	1.37	1.51	1.55	1.63	1.60	1.58	1.42	0.84	1.44

L.S.d 0.05 Hrs 0.02
L.S.d 0.05 days 0.02
L.S.d 0.05 interactions 0.05

2-2 percentage of flowering per hour

It is evident from the data in Tables (3,4) and Figure (4) that a similar trend to that of daily flowering percentage was also detected. The highest percentage of flowering per hour (2.17 and 2.25%) was obtained at 13 PM after which a decline was occurred. The minimum values (1.52 and 0.80%) detected at 8 A.M in the first season and the second season too.

The highest percentage of flowering was obtained on May 15th at 13 P.M. in the first season and the second season too. The least percentage of flowering was obtained on May 10th at 8 A.M in the first season. However , in the second season the least percentage of flowering was obtained on May 19th at 10 A.M.

The obtained results in this respect are in line with those obtained by Fawzi (1974), Fawzi et al., (1984); El Helw-Hunna & Gaser-Aisha (2005); and Staudt (1999).

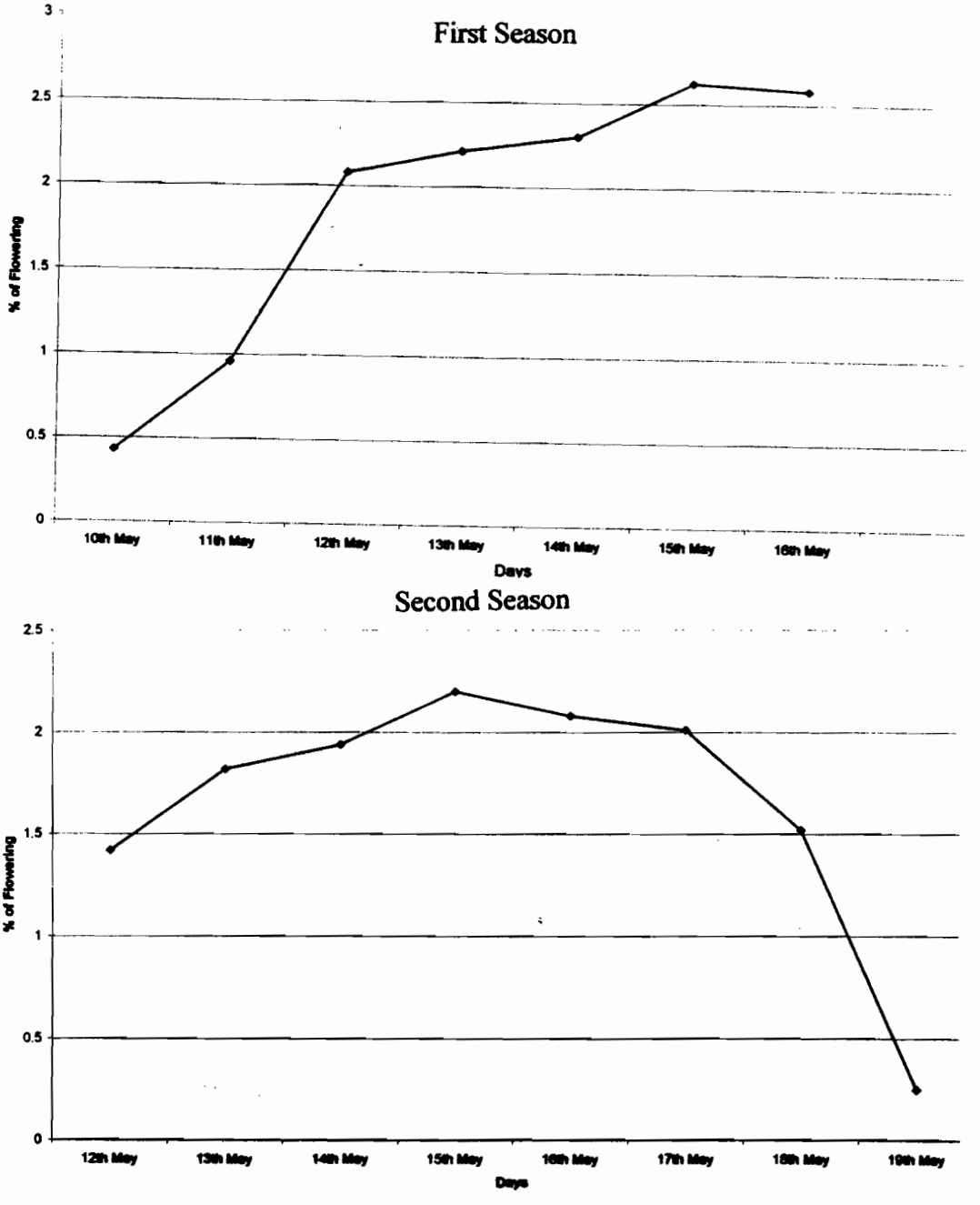
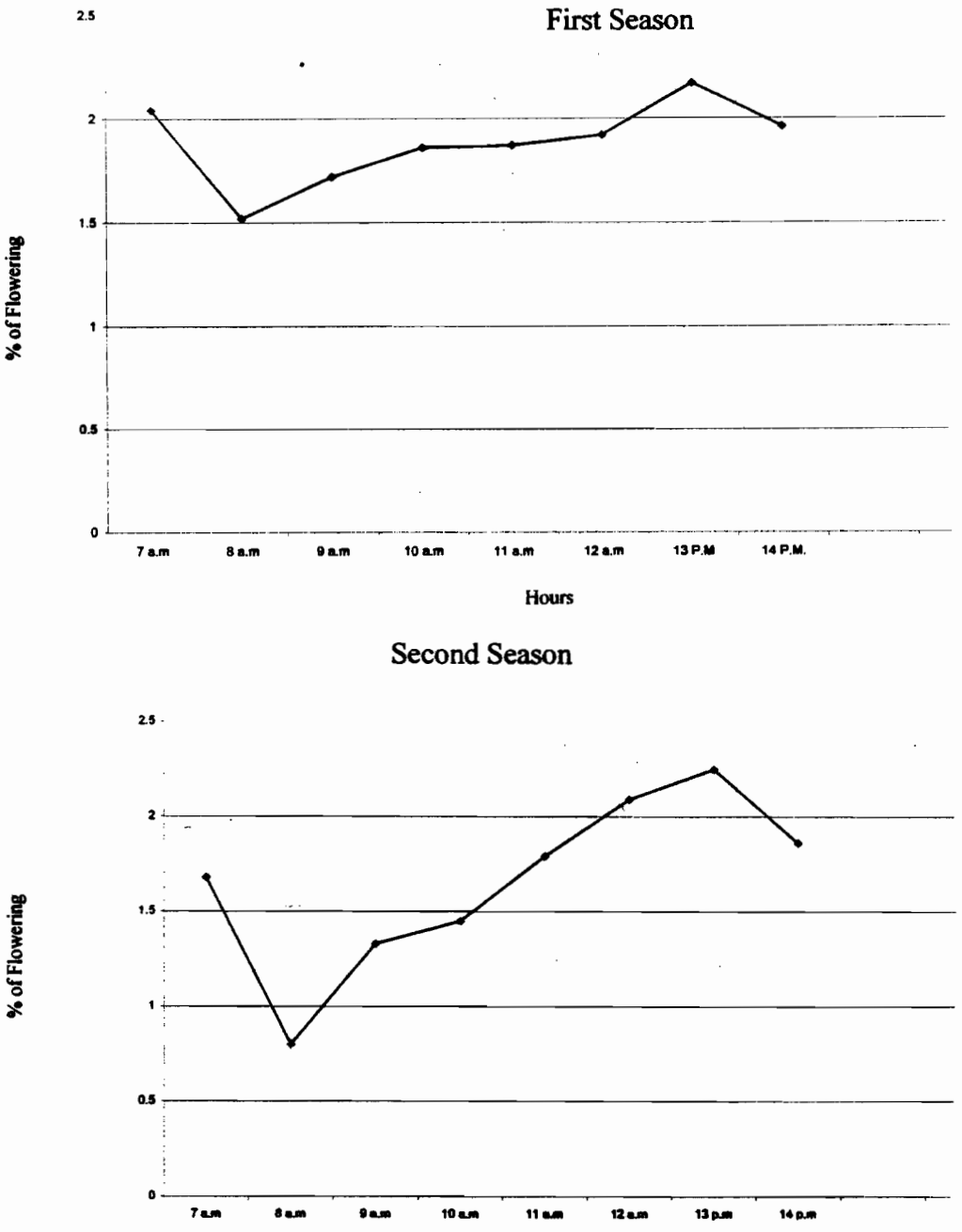


Fig. (3) : Percentage of flowering per day in Black Rose grapevince cv. During 2000 and 2001 seasons.



(Fig. 4): Percentage of flowering per hour in Black Rose grapevine cv. During 2000 and 2001 seasons.

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ديناميكية الأزهار فى كرمات العنب صنفى مطروح الأسود والبلاك روز

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تم دراسة ديناميكية الأزهار فى صنفين من أصناف العنب هما مطروح الأسود والبلاك روز تحت ظروف منطقة النوبارية خلال عامى ٢٠٠٠ ، ٢٠٠١ .

أشارت نتائج الدراسة أن النسبة المئوية للأزهار فى اليوم فى صنف العنب مطروح الأسود يزيد تدريجيا حتى يصل إلى الحد الأقصى لها فى اليوم الثالث والسابع للأزهار خلال موسمى التجربة وبعدها يحدث نقص حاد فى الأيام التالية للأزهار ولقد كانت أكبر نسبة مئوية للأزهار فى اليوم فى صنف العنب البلاك روز فى اليوم السادس للأزهار فى "الموسم الأول وفى اليوم الرابع للأزهار فى الموسم الثانى وكانت فترة إزهار العنقود فى صنف العنب مطروح الأسود من ٧-٩ أيام والصنف العنب البلاك روز من ٧ – ٨ أيام خلال موسمى التجربة أما النسب المئوية للأزهار فى الساعة فى كلا صنفى العنب فقد كانت منخفضة فى الساعة الثامنة صباحا ثم بدأت تزيد تدريجيا حتى وصلت إلى الحد الأقصى لها فى الساعة الواحدة ظهرا ثم إتجهت إلى النقص فى الساعة الثانية بعد الظهر .