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(0.01 > P)

142 120 % 137 197 233
%105 126 109 .%116 127 116 .%126
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Development of Testicular Dimensions and Relative Puberty in Shami Camel Males

Al-Asaad, A⁽¹⁾, S.A. Salhab,⁽²⁾ and M.B. Al-Daker⁽³⁾

ABSTRACT

This study was carried out at Camel Research Station, Deer Al-Hajar, Directorate of Animal Wealth Research, General Commission of Agricultural Scientific Research to measure the testicular dimensions, TDs (Length, TL; width, TW; Circumference, TC); the relationship between these parameters and to use them as an indicator to determine the puberty age in Shami camel males. Twenty five camel raised in the station were equally divided, according to their age, into five groups: G1, almost one year, G2, G3, G4, and G5 were 2, 3, 4 and 5 years old, respectively.

Results indicated that there was a considerable development, especially during the winter, in all TDs. The relative changes were different on a monthly basis from one group to another and significant effects ($P < 0.01$) were recorded among the general averages of these dimensions in the studied groups. The rates of relative changes in TL, TW and TC were 233, 197, and 137%, respectively in G1, while less relative changes were occurred in the other groups. They were 120, 142 and 126% in G2; 116, 127 and 116% in G3; 110, 125 and 105 in G4 and 115, 120 and 102% in G5, respectively. However, the largest relative change in the general averages of TL (167%) and TC (188%) were observed in G2. Relative correlations were positive and highly significant ($r = 0.60$ to 0.98 , $p < 0.01$) between TDs.

This research concluded that Shami camel males reach puberty age, based on TDs, when they are 2-3 years old and that the winter season has a positive effect on the growth of these TDs.

Key words: Testicular dimensions, Puberty, Shami camels, Syria

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Singh (1979) Osman 1975 Abdel-Raouf
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(1975) Omar Elwishy .(1991 Akingbemi)
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%137 198 233

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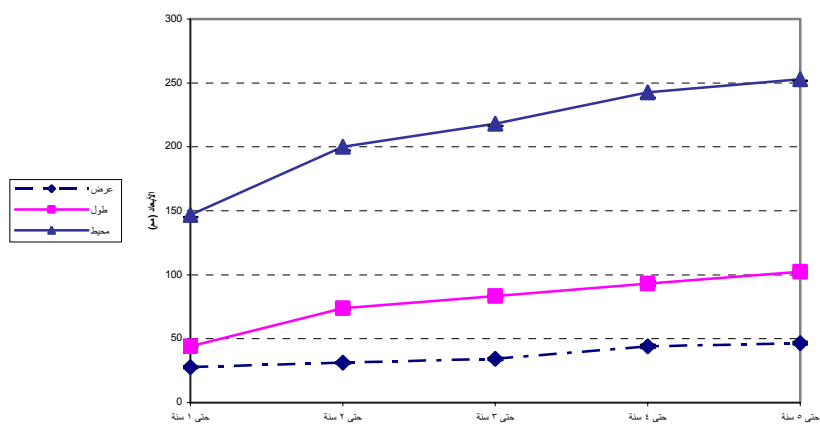
127 116

%105 126 109 %116
 . %102 120 115
 () (SE ± X) (1)

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%	±	%	±	%	±	
100	1.3 ± 102.2 ^a	100	0.8 ± 27.8 ^a	100	0.81 ± 44.1 ^a	
196	2.9 ± 200.1 ^b	112	0.6 ± 31.2 ^b	167	1.3 ± 73.8 ^b	
109	1.7 ± 218.1 ^c	109	0.8 ± 34.2 ^c	112	0.9 ± 83.3 ^c	
111	4.2 ± 242.7 ^d	128	1.3 ± 44.1 ^d	111	1.7 ± 93.2 ^d	
105	1.4 ± 254.6 ^e	105	1 ± 46.7 ^e	110	1.2 ± 102.3 ^e	
4.7		2.5		3.0		LSD
124	2.4 ± 212.5	111	0.9 ± 36.8	120	1.2 ± 79.3	

.(0.05 > P)



(1)

(0.01 > p) (2)

1.4±254.6 4.2 ±242.7 1.7± 218.1 2.9 ±200.1 1.5±106.4
 . 5 4 3 2 1
 3 2 1
 %112 %115 % 117
 % 104 105 (5 4)

الجدول (2) التغير في متوسط محيط الخصى (م) والتغير النسبي في ذكور الإبل الشامية (1-5 سنوات) خلال فترة الدراسة (12 شهراً)

الشهر	سنة		سنتان		ثلاث سنوات		أربع سنوات		خمس سنوات	
	متوسط	% تغير نسبي	متوسط	% تغير نسبي	متوسط	% تغير نسبي	متوسط	% تغير نسبي	متوسط	% تغير نسبي
أيار	0.8 ± 90.6 ^a	100	2.2 ± 173.6 ^a	100	2.3 ± 194.9 ^a	100	2.8 ± 231.1 ^{ab}	100	2.1 ± 245.6 ^{ab}	100
حزيران	0.7 ± 93.8 ^{ab}	104	2.3 ± 180.8 ^{ab}	104	2.4 ± 197.8 ^a	102	2.6 ± 231.5 ^{ab}	100	1.7 ± 244.9 ^{ab}	100
تموز	0.6 ± 95.8 ^b	106	4.1 ± 186 ^b	107	2.4 ± 204 ^b	105	1.8 ± 228.2 ^a	99	1.7 ± 243.8 ^a	99
أب	0.6 ± 97 ^b	107	2.9 ± 190.6 ^{bc}	110	2.6 ± 207.7 ^b	107	2.8 ± 229.5 ^{ab}	99	1.2 ± 242.7 ^a	99
أيلول	0.9 ± 98.2 ^{bc}	108	2.5 ± 195 ^c	112	1 ± 213.2 ^c	109	2.9 ± 237.6 ^{ab}	103	1.2 ± 248.1 ^b	101
تشرين الأول	0.9 ± 100.4 ^c	111	2.9 ± 197.7 ^c	114	0.8 ± 222 ^d	114	4.6 ± 241.4 ^b	104	1.3 ± 253.9 ^c	103
تشرين الثاني	1.5 ± 106.3 ^d	117	2.5 ± 200.8 ^c	116	0.6 ± 226.1 ^d	116	6.3 ± 249.3 ^b	109	2 ± 260.8 ^d	106
كانون الأول	0.9 ± 110.1 ^c	122	1.7 ± 207.8 ^{cd}	120	1.1 ± 230.3 ^c	118	6.2 ± 255.3 ^c	110	1 ± 266.6 ^e	109
كانون الثاني	1.4 ± 117.8 ^d	120	2.6 ± 212 ^d	122	1.3 ± 233.6 ^c	120	6.5 ± 260.4 ^c	113	1.2 ± 272.8 ^f	111
شباط	1.7 ± 119.2 ^g	132	2.8 ± 214 ^d	123	2.5 ± 232.6 ^c	119	5.9 ± 255.7 ^c	111	0.9 ± 267.6 ^e	109
آذار	1.6 ± 121.8 ^g	134	2.4 ± 216.9 ^d	125	1.8 ± 228.2 ^{df}	117	4.4 ± 248.7 ^{bc}	108	1.1 ± 257.3 ^e	105
نيسان	1.4 ± 124.2 ^g	137	1.5 ± 218.6 ^d	126	1.8 ± 226.6 ^d	116	3.5 ± 243.5 ^{bc}	105	0.9 ± 251.6 ^{bc}	102
أقل فرق LSD معنوي *		3.3	7.8		5.3		12.7		4.0	
أقل فرق معنوي عام LSD **					4.7					
التغير النسبي في المتوسط العام %		117	2.9 ± 200.1 ^b	115	1.7 ± 218.1 ^c	112	4.2 ± 242.7 ^a	105	1.4 ± 254.6 ^c	104
التغير النسبي في المتوسط العام %		100	188	109	111	111	111	111	105	105

* تشير الأحرف المختلفة في العمود الواحد إلى وجود فرق معنوي على مستوى ($0.05 > P$).
 ** تشير الأحرف المختلفة في الصف الواحد إلى وجود فرق معنوي على مستوى ($0.01 > P$) بين المتوسطات العامة.

(2)

(0.05>p)

3 2 1 232.6 230.3 214 207.8 119.2 - 110.1

) 6.5±260.4 ()
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(103.8)

(1988) Elwishy

1.7

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242.7 (4)

148 194

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303 297

(1991) Aire Akingbemi

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(1988) Djang

(1997) Abdel-Rahim

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(1988) Taha (a1978)

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(b a 1978) Bharadwaj Singh (1975) Abdel-Raouf (1979) Osman

(1982 Bongso)

(1991) Delgadillo

Cristofori)

(2) .(1986

%188 (3)

2.5

(0.01> p) (3)

1±46.7 1.3 ±44.1 0.8 ± 34.2 0.6 ±31.2 0.8± 27.8
5 4 3 2 1

% 165

% 114 114 116 125 (5 4 3 2)

(0.05 >p)

29.9

(0.05 >p) 31.8

الجدول (3) التغير في متوسطات (SE±X) عرض الخصى (مم) والتغير النسبي في ذكور الإبل الشامية (1-5 سنوات) خلال فترة الدراسة (12 شهر)

الشهر	خمس سنوات		أربع سنوات		ثلاث سنوات		سنتان		سنة	
	متوسط تغير نسبي %	متوسط تغير نسبي %	متوسط تغير نسبي %	متوسط تغير نسبي %	متوسط تغير نسبي %	متوسط تغير نسبي %	متوسط تغير نسبي %	متوسط تغير نسبي %	متوسط تغير نسبي %	متوسط تغير نسبي %
أيار	1.5 ± 40.8 ^a	100	1.1 ± 38.7 ^a	100	1.2 ± 29.5 ^{a1}	100	1 ± 2.5 ^a	100	0.4 ± 16.8 ^a	100
حزيران	1.2 ± 40.3 ^a	98	0.7 ± 38 ^a	102	1.2 ± 30.1 ^{ab}	106	0.6 ± 26.4 ^{ab}	124	0.8 ± 20.8 ^b	124
تموز	1 ± 39.1 ^a	96	0.9 ± 37 ^a	107	0.8 ± 31.5 ^{ab}	111	0.5 ± 27.8 ^b	142	1.1 ± 23.8 ^c	142
أب	0.4 ± 39 ^a	93	0.7 ± 36.1 ^a	109	0.8 ± 32.1 ^{bc}	120	0.5 ± 29.9 ^c	155	1.1 ± 26.1 ^{cd}	155
أيلول	0.6 ± 39.7 ^a	98	38 ^a 0.7 ±	113	0.9 ± 33.4 ^{bc}	126	0.6 ± 31.4 ^{cd}	160	1.4 ± 26.9 ^d	160
تشرين الأول	0.3 ± 42.4	104	^a 1.7 ± 40.3	115	1.1 ± 33.9 ^c	127	0.5 ± 31.7 ^d	170	1.8 ± 28.5 ^{de}	170
تشرين الثاني	0.6 ± 49.5 ^b	120	2.2 ± 46.6 ^b	120	0.8 ± 35.4 ^d	130	0.6 ± 32.6 ^{de}	178	0.8 ± 29.9 ^e	178
كانون الأول	0.9 ± 54.9 ^c	133	1.6 ± 51.4 ^c	122	0.8 ± 35.9 ^d	131	0.6 ± 32.8 ^{de}	183	0.3 ± 30.7 ^{ef}	183
كانون الثاني	1.2 ± 57.3 ^c	136	1.6 ± 52.8 ^c	125	0.5 ± 37 ^d	134	0.6 ± 33.6 ^e	186	0.4 ± 31.2 ^f	186
شباط	1.1 ± 55.6 ^c	133	1.3 ± 51.6 ^c	125	0.7 ± 37 ^d	136	0.5 ± 34.1 ^{ef}	189	0.6 ± 31.8 ^{ef}	189
آذار	1.2 ± 52.3 ^{cb}	129	1.6 ± 50.1 ^{bc}	126	0.6 ± 37.3 ^d	136	0.3 ± 34 ^{ef}	193	0.2 ± 32.4 ^{ef}	193
نيسان	1.5 ± 48.9 ^b	126	1.5 ± 48.7 ^{bc}	127	0.6 ± 37.4 ^d	142	0.4 ± 35.5 ^f	198	0.8 ± 33.2 ^f	198
أقل فرق معنوي LSD	3.0	3.9	2.4	2.4	1.6	2.6				
أقل فرق معنوي LSD عام	2.0	2.0								
المتوسط العام % التغير النسبي في المتوسط العام %	114	114	1.3 ± 44.1 ^d	116	0.8 ± 34.2 ^c	125	0.6 ± 31.2 ^b	165	0.8 ± 27.8 ^a	165
	106	129	110	110	112	100				

* تشير الأحرف المختلفة في العمود الواحد إلى وجود فرق معنوي على مستوى (0.05 > P).

** تشير الأحرف المختلفة في الصف الواحد إلى وجود فرق معنوي على مستوى (0.01 > P) بين المتوسطات العامة.

-102 %142-106
 3-2 %127
 (3)
 (0.05 >p)

) 1.6±52.8 ()
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.(2000 Hafez Hafez)

(1997) Abdel Rahim 0.8 ± 34.2
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 7-3 (1988) Taha 46.7 44.1
 (1975) Omar Elwishy 43-41
 (8.7 ± 43.3)
 (1991) Aire Akingbemi
 4.14±45 3
 (1997) Anaouassi Tibary
 51 3
 (a1978) Bharadwaj Singh
 60 30

(0.01>p)

3 2)

(%174)

.(4) %109 109 111 113 (5 4
%232 111

(0.05>p)

. (/)

(0.05>p)

%120 106

. /

(0.05>p)

%116 101

. /

) 1.7±105.5 ()
() 1.5±117.3 (

.(2000 Hafez Hafez)

1.3±59.2 (4)
(/)

(2.5± 65.5) (0.05>p)

(/)
) 1.3± 78.5 ()
 1.6±93.5 () 0.7± 87 ()
 (1.4± 74.9) (1.4±93.7) (2.5±85.8)

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%167

2.5

87 74.9
 (3) (1970) Novoa 0.9 ± 83.3
 Hemeida 100-70
 Taha 81 (1985)
 3 (1988)
 .(3 2) 80-76
 (1997) Anaouassi Tibary
 91 3
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 130

Salisbury)

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الجدول (4) التغير في متوسطات طول الخصى (م) والتغير النسبي في نكور الإبل الشامية (1-5 سنوات) خلال فترة الدراسة (12 شهرا)

الشهر	سنة		سنتين		ثلاث سنوات		أربع سنوات		خمس سنوات	
	متوسط	تغير نسبي %	متوسط	تغير نسبي %	متوسط	تغير نسبي %	متوسط	تغير نسبي %	متوسط	تغير نسبي %
أيار	1 ± 25.4 ^a	100	2.5 ± 65.5 ^a	100	1.4 ± 74.9 ^a	100	2.5 ± 85.8 ^a	100	1.4 ± 93.7 ^b	100
حزيران	0.7 ± 28.3 ^b	111	1 ± 69.3 ^{ab}	106	0.8 ± 75.9 ^{ab}	101	2 ± 85.3 ^a	99	1 ± 92.8 ^b	99
تموز	0.9 ± 32.5 ^c	128	1.8 ± 70.5 ^b	108	0.8 ± 78.1 ^b	104	2.1 ± 83.5 ^a	97	0.7 ± 91.2 ^b	97
أب	1.2 ± 35.5 ^d	140	1.7 ± 71.4 ^{bc}	109	1.2 ± 79.4 ^{bc}	106	1.7 ± 83.2 ^a	97	0.9 ± 89.6 ^a	96
أيلول	0.9 ± 40 ^c	157	1.2 ± 75.4 ^{cd}	115	0.3 ± 81.6 ^{cd}	109	1.4 ± 87.2 ^a	102	0.8 ± 92.4 ^{ab}	99
تشرين الأول	0.8 ± 45.4 ^t	179	1.3 ± 75.8 ^d	116	0.9 ± 84.1 ^d	112	1.4 ± 92.1 ^b	107	1.4 ± 98.9 ^c	106
تشرين الثاني	0.8 ± 50.7 ^s	200	1.5 ± 75.5 ^c	115	0.8 ± 86.6 ^{de}	116	1.3 ± 97.8 ^c	114	1.4 ± 106.3 ^d	113
كانون الأول	0.8 ± 51.1 ^{gh}	201	1.1 ± 75.7 ^d	116	0.4 ± 87.1 ^e	116	1.7 ± 103.2 ^d	120	1 ± 110 ^c	117
كانون الثاني	0.8 ± 52.3 ^{gh}	206	1.1 ± 76.2 ^d	116	0.5 ± 88.5 ^c	118	1.7 ± 105.5 ^d	123	1.5 ± 117.3 ^t	125
شباط	0.8 ± 53.7 ^h	211	1 ± 76.6 ^d	117	2.1 ± 88.1 ^c	118	1.5 ± 103.3 ^d	120	1.6 ± 115.1 ^t	123
آذار	1.1 ± 55 th	217	1.2 ± 77.4 ^d	118	1.4 ± 87.8 ^c	117	1.3 ± 87.4 ^a	114	1.5 ± 112 ^c	120
نيسان	1.3 ± 59.2 ^t	233	1.3 ± 78.5 ^a	120	0.7 ± 87 ^c	116	1.6 ± 93.5 ^b	109	1.4 ± 107.9 ^{de}	115
أقل فرق معنوي * LSD		2.6	4.2		2.9		4.9		3.5	
أقل فرق معنوي علم LSD					3.0					
المتوسط العام %	0.81 ± 44.1 ^u	174	1.3 ± 73.8 ^b	113	0.9 ± 83.3 ^c	111	1.7 ± 93.2 ^d	109	1.2 ± 102.3 ^c	109
التغير النسبي في المتوسط العام %		100	167		113		112		110	

* تشير الأحرف المختلفة في العمود الواحد إلى وجود فرق معنوي على مستوى (0.05 > P) .
** تشير الأحرف المختلفة في السطر الواحد إلى وجود فرق معنوي على مستوى (0.01 > P) بين المتوسطات العامة .

Fouad

(a1978) Bharadwaj Singh (1979) Lombardini (1979)

(1981) Sharma Vyas (3-2)

Khanna (1973) Kohli Khan (1971) Khan (1987)
5 3

(1988) Sghiri (1985) Arthur

(1977) Oduor-Okelo Gombe (3)

(2000) Al Eknah

()

(5)

0.60** (r) (0.01>P)
(.0.96 = r) 0.96**

(r) (5)

5	4	3	2	1	5	4	3	2	1
**0.88	**0.88	**0.93	**0.60	**0.98	**0.95	**0.86	**0.80	**0.65	**0.93
**0.89	**0.79	**0.85	**0.92	**0.79					

0.01 >P **

2.5

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