

## Milk Yield Traits of Holstein Cows Raised at a Private Dairy Farm in Boğazlıyan District of Yozgat Province\*

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Received: 08.04.2013

Accepted: 29.05.2013

### SUMMARY

This study was conducted to evaluate milk yield traits of Holstein cows raised at a private dairy farm in Boğazlıyan district of Yozgat province. A total of 387 of 192 Holstein cows raised between 2007 and 2010 were analyzed. Overall means of lactation duration, lactation milk yield, 305-days milk yield, and the length of dry period were 337.2 days, 6516.4 kg, 6189 kg and 64.3 days, respectively. Effects of calving year, lactation number, calving season and calving age on lactation duration were significant at different levels ( $P<0.001$ ,  $P<0.05$ ). Effects of calving year and lactation number on lactation milk yield were significant at different levels ( $P<0.001$ ,  $P<0.05$ ). The effect of calving age on 305-days milk yield was significant ( $P<0.05$ ). Furthermore, effects of calving year, lactation number and calving age on dry period were significant at different levels ( $P<0.001$ ,  $P<0.05$ ). In conclusion, lactation and 305-days milk yields of Holstein cows were higher than values reported for same breed by some researchers, lactation duration was higher than standard value and length of dry period was similar to the ideal value.

### Key Words

Holstein cows, Lactation duration, Lactation milk yield, Length of dry period

## Yozgat İli Boğazlıyan İlçesinde Özel Bir Süt İşletmesinde Yetiştirilen Holştayn İneklerin Süt Verim Özellikleri

### ÖZET

Bu araştırma, Yozgat ili Boğazlıyan ilçesinde özel bir süt işletmesinde yetiştirilen Holştayn ineklerin süt verim özelliklerini belirlemek amacıyla yapılmıştır. Araştırmanın materyalini 192 baş Holştayn ineğin 2007 ve 2010 yılları arasındaki 387 veri kaydı oluşturmuştur. Holştayn ineklerin laktasyon süresi, laktasyon süt verimi, 305 günlük süt verimi ve kuruda kalma süresine ait ortalama değerler sırasıyla, 337.2 gün, 6516.4 kg, 6189 kg ve 64.3 gün olarak bulunmuştur. Laktasyon süresine buzağılama yılı, laktasyon sırası, doğum mevsimi ve buzağılama yaşının etkisi farklı düzeylerde ( $P<0.001$ ,  $P<0.05$ ), laktasyon süt verimine buzağılama yılı ve laktasyon sayısının etkisi farklı düzeylerde ( $P<0.001$ ,  $P<0.05$ ), 305 günlük süt verimine buzağılama yaşının ( $P<0.05$ ) ve kuruda kalma süresine ise buzağılama yılı, laktasyon sayısı ve buzağılama yaşının etkileri farklı düzeylerde ( $P<0.001$ ,  $P<0.05$ ) önemli bulunmuştur. Sonuç olarak, Holştayn ineklerinin laktasyon ve 305 günlük süt verimleri, bazı araştırmacıların aynı ırk için bildirdikleri bulgulardan daha yüksek, laktasyon süresinin standart süreden daha uzun ve kuruda kalma süresinin ise ideal süreye benzerlik gösterdiği saptanmıştır.

### Anahtar Kelimeler

Holştayn inek, Laktasyon süresi, Laktasyon süt verimi, Kuruda kalma süresi

### INTRODUCTION

Holstein cattle are known as the most important dairy breed in the world. Holstein cows are raised in various ecological conditions, because they have adaptation skills for different environment conditions.

It is accepted that livestock sector has strategic importance by all over the world. That livestock has strategic importance is based on importance of animal originated proteins in morphological and physiological growing. Cattle have an important contribution to milk and meat production in the world. Contribution to milk production in the world of cows is more distinctive. In fact, contribution to milk production in the world is 84%. Also, contribution to milk production in the European Union countries of cows is 96.8%. As it is seen, almost whole milk in the European Union countries is provided from cows.

When status of issue is examined in terms of Turkey, it will be seen that contribution to whole milk production of cows is 87%. These information shows that cattle breeding has a great source in livestock Akman et al.(2005).

Holstein cattle are one of the most important dairy cattle breeds in Turkey. For this reason, investigation of milk yield traits of Holstein cows raised at private farms in Turkey has a great importance. This study was conducted to evaluate milk yield traits of Holstein cows raised at a private dairy farm in Boğazlıyan district of Yozgat province.

### MATERIALS and METHODS

#### The study area

The study was conducted at a private dairy farm in Boğazlıyan district of Yozgat province, Turkey. Boğazlıyan

is located between 39° 49' north latitude and 39° 48' east longitudes, and altitude of the study area is 1300 m.

### Animals and data collection

A total of 387 records of 192 Holstein cows raised between 2007 and 2010 were analyzed. Milk yield traits included lactation duration, lactation milk yield, 305-days milk yield and dry period. Effects of calving year, lactation number, calving season and calving age on milk yield traits were investigated. At the farm, cows were milked during lactation period twice a day (morning- evening) and their daily milk yields were recorded. Lactation duration and lactation milk yields of cows were calculated from these records. Milk yields were standardized to 305-days by using adjustment factors reported by Alpan and Aksoy (2009).

### Statistical analysis

The General Linear Model (GLM) was utilized for variance analyses of milk yield traits. Duncan's multiple range test was used for multiple comparisons of each trait (SAS 1995).

## RESULTS

### Lactation duration

The least squares means, significance and multiple comparison test results belong to milk yield traits of Holstein cows are presented in Table. When Table is examined, effects of calving year, lactation number, calving season and calving age were significant at different level ( $P < 0.001$ ,  $P < 0.05$ ) on lactation duration. The lowest lactation duration was seen in 2007, year means indicated that there was a decreasing trend in lactation duration

from 2008 to 2010. Lactation duration was longest in cows calved in spring season, also lactation duration increased with increasing calving age.

### Lactation milk yield

Lactation milk yield was influenced at different levels ( $P < 0.001$ ,  $P < 0.05$ ) by calving year and lactation number, whereas effects of calving season and calving age were non-significant ( $P > 0.05$ ) on lactation milk yield. The highest lactation milk yield was seen in 2008, year means indicated that there was an increasing trend in lactation milk yield from 2007 to 2008, however there was a decreasing trend in lactation milk yield from 2008 to 2010. Furthermore; the highest lactation milk yield was obtained in the third lactation.

### 305-days milk yield

Effects of calving year, lactation number and calving season on 305-days milk yield were non-significant ( $P > 0.05$ ), whereas effect of calving age on 305-days milk yield was significant ( $P < 0.05$ ). 305 days milk yield decreased with increasing calving age.

### Dry period

Effects of calving year, lactation number and calving age were significant at different level ( $P < 0.001$ ,  $P < 0.05$ ) on dry period, however the effect of calving season on dry period was non-significant ( $P > 0.05$ ). There was an increasing trend in length of dry period from 2007 to 2008, and the highest dry period was seen in 2010. The lowest dry period was in the first lactation; also the lowest dry period was seen in cows at 2 years of age.

**Table 1.** The least squares means, significance and multiple comparison test results belong to milk yield traits of Holstein cows

Factors	n	Lactation duration (day)		Lactation milk yield (kg)		305-days milk yield (kg)		Dry period (day)	
		$\bar{X} \pm S \bar{X}$		$\bar{X} \pm S \bar{X}$		$\bar{X} \pm S \bar{X}$		$\bar{X} \pm S \bar{X}$	
<b>General mean</b>	387	337.2	4.29	6516.4	91.09	6189.0	58.20	64.3	1.00
<b>Calving year</b>			***		***		ns		***
2007	9	305.0 <sup>b</sup>	27.88	6027.5 <sup>b</sup>	622.1	5948.1	410.45	61.6 <sup>b</sup>	6.48
2008	58	399.1 <sup>a</sup>	13.26	7406.0 <sup>a</sup>	295.9	6399.4	195.26	66.5 <sup>ab</sup>	3.20
2009	172	371.6 <sup>a</sup>	8.77	6918.4 <sup>ab</sup>	195.7	6175.2	129.09	64.9 <sup>ab</sup>	2.18
2010	148	314.1 <sup>b</sup>	8.12	5894.8 <sup>b</sup>	181.2	5892.3	119.53	69.2 <sup>a</sup>	2.44
<b>Lactation number</b>			*		*		ns		*
1 <sup>st</sup> Lactation	188	359.5 <sup>a</sup>	13.51	6487.7 <sup>b</sup>	301.4	5889.1	198.87	62.6 <sup>b</sup>	3.41
2 <sup>nd</sup> Lactation	156	328.9 <sup>b</sup>	13.03	6353.5 <sup>b</sup>	290.8	6066.1	191.88	68.0 <sup>a</sup>	3.26
3 <sup>rd</sup> Lactation	43	353.9 <sup>a</sup>	17.66	6843.8 <sup>a</sup>	394.0	6356.1	259.96	66.1 <sup>a</sup>	4.59
<b>Calving season</b>			*		ns		ns		ns
Spring	38	374.1 <sup>a</sup>	14.00	6698.7	312.5	5998.8	206.21	67.4	3.55
Summer	93	329.3 <sup>b</sup>	11.62	6309.4	259.3	6057.5	171.10	67.2	2.76
Autumn	152	335.4 <sup>b</sup>	11.98	6425.2	267.3	6092.7	176.39	64.6	2.90
Winter	104	350.9 <sup>a</sup>	11.93	6813.4	266.2	6266.0	175.66	63.0	3.00
<b>Calving age (year)</b>			*		ns		*		*
2	163	324.9 <sup>c</sup>	13.70	6889.5	305.8	6427.2 <sup>b</sup>	201.73	64.3 <sup>b</sup>	3.31
3	141	349.2 <sup>b</sup>	11.83	6744.7	264.1	6279.2 <sup>ab</sup>	174.25	65.2 <sup>ab</sup>	3.02
4	64	340.8 <sup>b</sup>	12.87	6480.8	287.2	6032.0 <sup>ab</sup>	189.51	66.4 <sup>a</sup>	3.44
5	19	374.7 <sup>a</sup>	23.80	6431.6	531.2	5676.7 <sup>a</sup>	350.46	66.2 <sup>a</sup>	5.87

\* $P < 0.05$ ; \*\*\* $P < 0.001$ ; ns: Non-significant ( $P > 0.05$ ); Means within the same column followed by different letters significantly differ

## DISCUSSION and CONCLUSION

### Lactation duration

In this study, lactation duration of Holstein cows was 337.2 days. This value is higher than standard 305-days. This finding was higher than findings reported for Holstein cows by some literatures (Kaygısız 1997; Bilgiç and Yener 1999; Özçelik and Arpacık 2000; Pelister and Altinel 2000; Duru and Tuncel 2002; Bakır and Çetin 2003; Bilgiç and Alıç 2005; Sehar and Özbeyaz 2005; Erdem et al. 2007; Bayrıl 2009) whereas the finding of the present study was lower than findings noticed by Atay et al. (1995), Akkaş (2007), and Parlak (2008). Differences among literatures could be related to genotype, management and feeding.

In the current study, the effect of calving year on lactation duration was significant. This finding was similar to findings reported by literatures (Kaygısız 1997; Duru and Tuncel 2002; Bilgiç and Alıç 2005; Sehar and Özbeyaz 2005; Topaloğlu and Güneş 2005; Türkyılmaz 2005; Akkaş 2007; Koçak et al. 2007; Parlak 2008; Bayrıl 2009). On the contrary many workers observed that the effect of calving year had a non-significant effect on lactation duration in Holstein cows (Duru and Tuncel 2002; Sehar and Özbeyaz 2005; Akkaş 2007; Koçak et al. 2007 and Parlak 2008). The effect of lactation number was significant on lactation duration. This finding obtained in the present study was consistent with findings reported by some literatures (Topaloğlu and Güneş 2005; Bayrıl 2009), but was not in accordance with findings noticed by (Duru and Tuncel 2002; Sehar and Özbeyaz 2005; Akkaş 2007). Also, lactation duration did influenced by calving season. This result was similar to results with reported by (Topaloğlu and Güneş 2005; Türkyılmaz 2005), however was inconsistent with findings of literatures (Duru and Tuncel 2002; Bilgiç and Alıç 2005; Sehar and Özbeyaz 2005; Akkaş 2007). Differences among literatures may be caused from factors such as breeding system, genotype and feeding. The effect of calving age on lactation duration was statistically significant. This finding is consistent with finding reported by Kumlu and Akman (1999). This confirms that lactation duration increases with age up to maturity.

### Lactation milk yield

Lactation milk yield in this study was 6516.4 kg. This value was higher than values reported for Holstein cows by many researchers (Pelister and Altinel 2000; Duru and Tuncel 2002; Bakır and Çetin 2003; Özçakar and Bakır 2003; Erdem et al. 2007), however this value was lower than values noticed for same breed by many literatures (Yaylak 2003; Topaloğlu and Güneş 2005; Toksoy 2007; Bayrıl 2009).

In this research, effects of calving year on lactation milk yield were significant. This result was similar to results with reported by many literatures (Pelister and Altinel 2000; Duru and Tuncel 2002; Bayrıl 2009). On the other hand, cows calving in summer have lower lactation milk yields, this finding may be due to high environmental temperatures. Also, in the current study, the effect of lactation number on lactation milk yield was significant. This result was similar to results reported by many workers (Duru and Tuncel 2002 and Bayrıl 2009), On the contrary, Tekerli and Gündoğan (2005) observed that the effect of lactation number had a non-significant effect on lactation milk yield in Holstein cows.

### 305-days milk yield

In the present study, 305 days milk yield of Holstein cows was 6189.0 kg. This value was higher than values reported by many researchers (Özcan and Altinel 1995; Kaygısız 1997; Kumlu and Akman 1999; Özçelik and Arpacık 2000; Duru and Tuncel 2002; Özçakar and Bakır 2003; Bilgiç and Alıç 2005), was lower than value noticed by Bayrıl 2009, and was similar to values reported by Bakır and Çetin (2003), and Yaylak (2003).

Effects of calving year, lactation number and calving season were not significant 305-days milk yield. These findings were similar to findings reported for Holstein cows by Sehar and Özbeyaz (2005), Bilgiç and Alıç (2005). On the contrary, the findings of the present study were inconsistent with findings reported by Bayrıl (2009) and Akkaş (2007). Also, in this study, the effect of calving age on 305-days milk yield was significant. Similarly, Bayrıl (2009), Parlak (2008), Tekerli and Gündoğan (2005) observed that the effect of calving age had a significant effect on 305-days milk yield in Holstein cows. However, Sehar and Özbeyaz (2005), Akkaş (2007), and Toksoy (2007) reported that the effect of calving age had a non-significant effect on 305-days milk yield. These differences may be due to management and environmental conditions.

### Dry period

Dry period in the current study cows was 64.3 days. This value was similar to the ideal value (60 days), and was higher than values reported by some researchers (Bakır and Çetin 2003; Bayrıl 2009), whereas it was lower than values noticed by many literatures (Kumlu and Akman 1999; Özçelik and Arpacık 2000; Pelister and Altinel 2000; Özçakar and Bakır 2003; Yaylak 2003; Sehar and Özbeyaz 2005; Erdem et al. 2007). Effects of calving year, lactation number and calving age were significant on dry period. Similarly, Pelister and Altinel (2000) observed that dry period was affected by lactation number and calving year.

In conclusion, lactation and 305-days milk yields of Holstein cows were higher than values reported for same breed by some researchers, lactation duration was higher than standard value and length of dry period was similar to the ideal value.

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