Bulgarian Journal of Agricultural Science, 21 (No 2) 2015, 436–439
Agricultural Academy

MILK YIELD PERFORMANCES OF BROWN SWISS COWS RAISED AT MUS ALPARSLAN STATE FARM IN TURKEY

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Abstract

CAK, B. and O. YILMAZ, 2015. Milk yield performances of Brown Swiss cows raised at Mus Alparslan State Farm in Turkey. *Bulg. J. Agric. Sci.*, 21: 436–439

This research was carried out to reveal milk yield performances of Brown Swiss cows bred at Mus Alparslan State Farm in Turkey, and contribute to projection of the farm in the future. In the research, a total of 935 data belonging to 280 cows between the years 2005-2010 were used. Average lactation milk yield, 305-days milk yield, and lactation length of Brown Swiss cows, are determined respectively as 4639.79 kg, 4478.31 kg and 308.83 days. It is founded that effect of lactation number, calving year, and calving season are significant ($P < 0.001$) on lactation milk yield and 305-days milk yield, but the effect of calving age was not significant ($P > 0.05$); furthermore effects of calving age, lactation number, calving year, and calving season were not significant ($P > 0.05$) on lactation length. The results of this study showed that milk yield performances of Brown Swiss cows raised at Mus Alparslan State Farm are better than findings of researches conducted in previous years in the same farm, and lactation length resembles to standard lactation length suggest that herd directing programs is directed well, however lactation milk yield of Brown Swiss cows is lower than findings stated for the same breed cow in some local and foreign literatures. For this reason, making researches for improving milk yield performances of Brown Swiss cows in the farm will be beneficial.

Key words: Brown Swiss cow, lactation milk yield, lactation length, environmental factors

Introduction

In a dairy cow farm, maintaining and profit depend on superior yielding animals and a good herd directing in a dairy cow farms. These, worth of cows are evaluated with amount of milk they yield during their lives and contribution to the farm. For this reason, those farms follow yield performance of herds, and yield of animals, present positive or negative environmental factors is very significant for farm. Dairy cow breedings are done successfully in most of farms in Turkey. Some of dairy cow farms prefer Brown Swiss cows having ability to adapt to various climate conditions. One of significant yield performances of this breed is milk yield. Milk production in Turkey has raised with 8.5% rate in 2010 compared with the previous year in contrast to slowdown in the worldwide and has been recognized as 13.605.600 tons and cow milk has comprised 91.7% of whole milk production (Ataseven and Gülaç, 2011). It is stated that lactation milk yield of Brown Swiss cows is between 3062-5753.18 kg in some local literatures (Bakir and Kaygisiz, 2003; Özbeyaz and Küçük, 1999; Özbeyaz et al., 1998; Şeker and Bayraktar, 2011; Tilki et al., 2005) and it is between 4168.9 - 8850.49 kg in some foreign literatures (ASR, 2012; BSA, 2012; Chrenek et al., 2003; SBZV, 2012; ZAR, 2012). In addition, effect of various environmental factors to milk yield of Brown Swiss cows are examined in a lot of researches. In some researches, year (Can, 2002; Tilki et al., 2003), age (Özbeyaz and Küçük, 1999; Tilki et al., 2003), calving season (Özbeyaz and Küçük, 1999; Can, 2002; Çilek and Bakir, 2010) have significant effect on lactation milk yield. This

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research was carried out to reveal milk yield performances of Brown Swiss cows raised at Mus Alparslan State Farm in Turkey, and contribute to projection of the farm in the future.

Materials and Methods

Animals and Data recording

The study was carried out at Mus Alparslan State Farm, Mus and Turkey. A total of 935 data belonging to 280 Brown Swiss cows raised between the years 2005–2010 in the farm comprised material of this research. In farm, cows were housed in a free-stall barn, grazed in pastures during the summer, but fed with corn silage, forage (alfalfa hay), and concentrated feed during periods when climate conditions are not good. In farm, cows were milked during lactation period twice a day (morning- evening) and their daily milk yields were recorded. Lactation lengths and lactation milk yields of cows were calculated from these records. Some animals had a shorter and longer lactation period than 305-days. In case a cow produced milk more than 305-days, the production during the first 305-days of lactation was calculated. Milk yields of cows which have less than 305-days of lactation period without health or such other problems were considered as 305-days milk yield. However, in case a cow produced milk less than 305-days due to health or such other problems, milk production for lactation length were standardized to 305-days by using adjustment factors reported by Alpan and Aksoy (2009)**.**

Statistical analyses

Data were analyzed by least squares means using General Linear Model procedure of SAS (SAS, 1995). The importance of control of the differences between averages of more than two groups was performed with Duncan test (SAS, 1995).

Table 1
The least squares means, significance and multiple comparison test results belong to milk yield characteristics of Brown Swiss cows

Factors	n	Lactation milk yield, kg	305-days milk yield, kg	Lactation length, day
		$\bar{X} \pm S\bar{x}$	$\bar{X} \pm S\bar{x}$	$\bar{X} \pm S\bar{x}$
General mean	935	4639.79 ± 83.82	4478.31±72.48	308.83 ± 3.39
Calving age (Year)		N.S.	N.S.	N.S.
3	20	4729.89 ± 212.92	4547.73 ± 184.13	309.73 ± 8.62
4	83	4582.73 ± 120.60	4432.68 ± 104.29	308.47 ± 4.88
5	117	4552.64 ± 100.23	4387.19 ± 86.67	309.24 ± 4.06
≥ 6	715	4693.93 ± 54.85	4545.63 ± 47.43	307.87 ± 2.22
Lactation number		***	***	N.S.
Lactation	290	4230.11^{b} ± 75.20	4077.59^{b} ± 65.03	309.18 ± 3.04
Lactation	251	4621.09^{a} ± 89.96	4475.40^{a} ± 77.80	307.10 ± 3.64
Lactation	148	4833.59^{a} ± 107.86	4643.00^{a} ± 93.28	310.10 ± 4.64
Lactation	109	4779.09^{a} ± 116.40	4592.85^{a} ± 100.66	312.30 ± 4.71
Lactation	67	4716.98^{a} ± 133.14	4562.34^{a} ± 115.14	308.35 ± 5.39
Lactation	70	4657.92^{a} ± 130.53	4518.67^{a} ± 112.88	305.95 ± 5.28
Calving year		***	***	N.S.
2005	279	4264.52^{b} ±110.07	3980.76^{b} ± 95.19	317.19 ± 4.45
2006	174	4058.23^{b} ±117.21	3925.70^{b} ± 101.37	307.85 ± 4.74
2007	154	4075.25^{b} ±107.63	3862.97^{b} ± 93.08	311.93 ± 4.35
2008	158	4945.69^{a} ± 92.14	4740.41^{a} ± 79.69	309.95 ±3.73
2009	159	5249.79^{a} ± 74.57	5140.72^{a} ± 64.49	304.61 ± 3.02
2010	11	5245.29^{a} ±255.18	5259.31^{a} ± 220.68	301.44 ± 10.34
Calving season		***	***	N.S.
Autumn	229	4441.70^{b} ± 95.08	4330.75^{b} ± 82.22	304.07 ± 3.85
Winter	226	4819.66^{a} ± 94.64	4592.75^{a} ± 84.43	314.17 ± 3.95
Spring	221	4797.28^{a} ± 98.91	4611.10^{a} ± 85.53	311.39 ± 4.00
Summer	259	4500.54^{b} ± 93.13	4378.64^{b} ± 80.53	305.70 ± 3.77

^{a,b}Means within the same columns followed by different letters significantly differ
Non significant: P > 0.05, ***P < 0.001

Results

The least squares means, significance and multiple comparison test results belong to milk yield characteristics of Brown Swiss cows are represented in the Table 1. When Table 1 is analyzed, lactation milk yield is higher in 3-aged cows, but differences between cows' milk yields in different age groups are statistically not significant. When Brown Swiss cows' lactation milk yields are considered according to lactation number, differences among cows with different lactation number were statically significant ($P < 0.001$) this difference was based on cows in 1st lactation. When Cows' lactation milk yields are considered according to years, effect of calving year to lactation milk yield was very significant ($P < 0.001$). In Table 1, lactation milk yields of cows calving in winter and spring are higher than calving in autumn and summer, and these differences are statistically very significant ($P < 0.001$). In Table 1, when effects of various environmental factors on 305-days milk yield are examined, age has no effect on 305-days milk yield, but effects of lactation number, calving year, and calving season were significant ($P < 0.001$), also it is determined that effects of all the environmental factors on lactation length were not significant ($P > 0.05$).

Discussion

Knowing milk yield performances of cows bred in a farm is quite important, because activities that should be applied in the farm are exhibited, and these activities are ameliorating the environmental factors or improving genotype. In addition, compared yield performances of animals in a farm with local and foreign literature notifications shows performance in animal production of the farm. For this reason, this research was made to reveal milk yield performances of Brown Swiss cows raised in Mus Alparslan State Farm, and contribute to projection of farm in the future. In this research, lactation and 305-days milk yields of Brown Swiss cows are respectively 4639.79 kg, and 4478.31 kg. In the previous years, in the same farm where some studies on Brown Swiss cows were carried out, 305-days milk yield (3211 kg) reported for Brown Swiss cows bred between the years 1985–1997 by Bakir and Kaygisiz (2003), lactation milk yield (4002.44 kg) and 305-days milk yield (3892.59 kg) founded for Brown Swiss cows raised between the years 1989–2004 by Şeker et al. (2009).

Milk yield performances of Brown Swiss cows in the present study are higher than literature findings above. This situation, there is an effort for improving Brown Swiss cows' milk yield performances at Mus Alparslan State Farm. In addition, lactation milk yield and 305-days milk yield of Brown Swiss cows in this research are higher than the values (3431.1 kg and 3297.7 kg) founded for Brown Swiss cows bred at Kirşehir Malya State Farm by Özbeyaz and Küçük (1999), the values (4172.68 kg and 4260.27 kg) reported for Brown Swiss cows bred at Malatya Sultan Suyu State Farm by Şeker and Bayraktar (2011), the values (3062 kg and 2968 kg) obtained for Brown Swiss cows bred at Bahri Dağdaş International Agricultural Research Institute by Tilki et al. (2005), but lower than the findings (5753.18 kg and 5468.99 kg) reported for Brown Swiss cows bred at Malya State Farm by Özbeyaz et al. (1998). Also, lactation milk yield of Brown Swiss cows in Germany is 6854 kg, ASR (2012); lactation milk yield of Brown Swiss cows in the USA is 8850.49 kg in 2010, BSA (2012); lactation milk yield of Brown Swiss cows in Switzerland is 6887 kg in 2009, Chrenek et al. (2003); lactation milk yield of Brown Swiss cows in Austria is 6736 kg in 2011, ZAR (2012).

In this research, lactation milk yield of Brown Swiss cows is lower than foreign literature findings above, but research finding shows that it parallels with findings (2168.9-4696.67 kg) that lactation milk yield of Brown Swiss cows by Chrenek et al. (2003). In this research, differing lactation milk yield of Brown Swiss cows various local and foreign literature notifications may be caused from differences in animal genotypes, breeding-feeding, environmental conditions. Effect of environmental factors to milk yield performances of Brown Swiss cows is examined in some researches. In this research, effects of lactation number, calving year, and calving season on lactation and 305-days milk yields were significant, and these findings are parallel with findings of researches on Brown Swiss cows in other farms (Özbeyaz and Küçük**,** 1999; Çilek and Bakir**,** 2010) and the same farm (Şeker et al., 2009). In the study, although determining that effect of age on lactation milk yield and 305-days milk yield is not significant, also some researchers reported that there was significant effect of age on milk yields of Brown Swiss cows (Özbeyaz and Küçük**,** 1999; Tilki et al., 2003; Çilek and Bakir, 2010).

In this research, lactation length of Brown Swiss cows is 308.83 days. It can be said that directing herd in the farm is good, although this lactation length is 4 days longer than standard lactation length (305 days). When compared findings of local and foreign references lactation length of Brown Swiss cows; lactation length is longer than 302 days (Bakir and Kaygisiz, 2003), 275.3 days (Tilki et al., 2005), 300.52 days (Şeker et al., 2009) and 302.2 days (Inci et al., 2006), but it is lower than 324.8 days (Özbeyaz and Küçük, 1999), 313.9 days (Tilki et al., 2003) and 319.39 days (Çakilli, 2007). Differing in lactation length in literatures may be

caused from herd directing programs, and animal genotypes. In the present study, effects of age, lactation number and calving season on lactation length were not significant ($P > 0.05$). However, in some literatures, effects of year and age on lactation length were significant (Özbeyaz and Küçük, 1999; Şeker et al., 2009; Çakilli, 2007).

Conclusion

The results of this study showed that milk yield performances of Brown Swiss cows raised at Mus Alparslan state farm are better than findings of researches conducted in previous years in the same farm, and lactation length resembles to standard lactation length suggest that herd directing programs is directed well, however lactation milk yield of Brown Swiss cows is lower than findings stated for the same breed cow in some local and foreign literatures. For this reason, making researches for improving milk yield performances of Brown Swiss cows in the farm will be beneficial.

Acknowledgements

The authors thank in kind support of Mr. Ahmet Manap and Mr. Mehmet Selver Köprü.

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Received February, 23, 2014; accepted for printing December, 2, 2014.