**Table 1. Least squares means and their standard errors (LSM±SE) of longevity traits.**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Classification1** | **Number of records** | **Lifespan (LS, months)** | **Productive life (PL, months)** | **Cow efficiency index (CEI, %)** | **Number of calvings (NC, calving)** |
| **Breed** |  | \*\* | \*\* | \*\* | \*\* |
| Shami | 495 | 96.3b±1.80 | 66.1b±1.81 | 64.9b±0.008 | 4.3b±0.12 |
| Holstein | 1129 | 73.2a±2.80 | 43.5a±2.81 | 56.4a±0.012 | 3.5a±0.19 |
| **Age at first calving****(AFC, months)** |  | **NS** | **\*\*** | **\*\*** | **NS** |
| <24 | 32 | 82.5±4.51 | 60.0b±4.53 | 69.1e±0.016 | 4.1±0.30 |
| 24-27.9 | 769 | 85.0±1.86 | 58.6b±1.87 | 64.1d±0.012 | 4.1±0.13 |
| 28-31.9 | 544 | 84.8±1.60 | 55.5b±1.61 | 61.0c±0.011 | 3.9±0.11 |
| 32-35.9 | 177 | 84.7±2.28 | 51.2a±2.29 | 56.4b±0.014 | 3.7±0.15 |
| ≥36 | 102 | 86.9±2.70 | 48.7a;±2.71 | 52.6a±0.014 | 3.6±0.18 |
| **First lactation milk yield (FLMY, kg)** |  | **NS** | **NS** | **NS** | **\*\*** |
| <1200 | 260 | 90.1±3.85 | 60.3±3.86 | 62.2±0.016 | 4.3b±0.26 |
| 1200-1999 | 168 | 82.4±2.85 | 52.4±2.86 | 59.6±0.012 | 3.9ba±0.19 |
| 2000-2799 | 131 | 82.2±2.33 | 52.2±2.33 | 59. 8±0.010 | 3.7a±0.16 |
| >2800 | 1065 | 84.2±2.41 | 54.3±2.41 | 61. 0±0.010 | 3.6a±0.16 |
| **Year of first calving (groups)** |  | \*\* | \*\* | **\*\*** | \*\* |
| 1982-1992 | 397 | 90.1c±1.91 | 60.3c±1.92 | 62.4b±0.008 | 4.2b±0.13 |
| 1993-2002 | 623 | 86.4b±1.77 | 56.4b±1.78 | 61.5b±0.008 | 4.0b±0.12 |
| 2003-2014 | 604 | 77.9a±1.99 | 47.8a±2.00 | 58.0a±0.008 | 3.4a±0.13 |
| **Season of first calving** |  | **NS** | **NS** | **NS** | **NS** |
| Winter | 428 | 84.7±1.96 | 54.8±1.96 | 60.7±0.008 | 3.9±0.132 |
| Spring | 361 | 84.7±2.00 | 54.7±2.00 | 60.6±0.008 | 3.8±0.135 |
| Summer | 418 | 84.8±1.95 | 54.8±1.96 | 60.6±0.008 | 3.8±0.131 |
| Autumn | 417 | 84.9±1.99 | 54.9±2.00 | 60.6±0.008 | 3.9±0.134 |

1Within each classification, means not followed by the same letter differ significantly at the 5 % level; Total number of records = 1624; \*\* (*P*< 0.01); NS = not significant.

**Table 2. Least squares means and their standard errors (LSM±SE) of productive lifetime traits.**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Classification1** | **Lifetime milk production (LMP, kg)** | **Total lactation periods** **(TLP, days)** | **Lifetime daily milk production****(LDMP, kg)** | **Total dry periods** **(TDP, days)** |
| **Breed** | **\*\*** | **\*\*** | **\*\*** | **\*\*** |
| Shami | 7713a±563.38 | 787a±33.43 | 2.7a±0.13 | 890b±25.55 |
| Holstein | 14406b±875.77 | 1049b±51.96 | 5.9b±0.20 | 275a±39.72 |
| **Age at first calving (AFC, months)** | **NS** | **\*\*** | **\*\*** | **\*\*** |
| ≤24 | 10969±1412.62 | 956ba±83.82 | 4.6b±0.32 | 729c±64.07 |
| 24-27.9 | 11833±583.36 | 977b±34.61 | 4.6b±0.13 | 604cb±26.46 |
| 28-31.9 | 11256±501.64 | 942ba±29.76 | 4.3ba±0.11 | 567ba±22.75 |
| 32-35.9 | 10470±715.46 | 875a±42.45 | 3.9a±0.16 | 514a±32.45 |
| ≥36 | 10771±844.79 | 842a±50.13 | 3.9a±0.19 | 497a±38.31 |
| **First lactation milk yield (FLMY, kg)** | **\*\*** | **\*\*** | **\*\*** | **\*\*** |
| <1200 | 10980a±1204.46 | 913ba±71.47 | 3.6a±0.27 | 714c±129.53 |
| 1200-1999 | 9219a±892.54 | 833a±52.96 | 3.8a±0.20 | 589cb±60.24 |
| 2000-2799 | 10149a±728.57 | 885a±43.23 | 4.1a±0.17 | 552ba±43.66 |
| > 2800 | 13891b±753.33 | 1042b±44.70 | 5.6b±0.17 | 473a±43.66 |
| **Year of first calving (group)** | **\*\*** | **\*\*** | **\*\*** | **\*\*** |
| 1982-1992 | 11410b±597.95 | 977b±35.48 | 4.1a±0.136 | 678c±27.12 |
| 1993-2002 | 11494b±554.20 | 993b±32.88 | 4.3a±0.126 | 574b±25.13 |
| 2003-2014 | 10275a±622.82 | 785a±36.96 | 4.5b±0.142 | 495a±28.25 |
| **Season of first calving** | **NS** | **NS** | **\*\*** | **NS** |
| Winter | 11585±612.66 | 932±36.35 | 4.4b±0.140 | 582±27.79 |
| Spring | 10859±625.32 | 915±37.10 | 4.2a±0.143 | 586±28.36 |
| Summer | 10603±610.11 | 908±36.20 | 4.1a±0.139 | 579±27.67 |
| Autumn | 11192±623.60 | 918±37.0 | 4.4b±0.142 | 581±28.28 |

1Within each classification in the same column means followed by different letters differ significantly; Total umber of records = 1624; \*\* (*P*< 0.01); NS = not significant.

**Figure. 1. The effect of the most important factors on longevity and productive lifetime traits according to PLS.**