

Using quantile regression for fitting lactation curve in dairy cows

Hossein Naemipour Younesi, Mohammad Mahdi Shariati, Saeed Zerehdaran, Mehdi Jabbari

Nooghabi and Peter Løvendahl

SUPPLEMENTARY FILE

Supplementary Tables

Table S1 Descriptive statistics of the data on first lactation Holstein cows

Table S2 Estimated parameters and standard errors (SE) of different functions and quantiles for milk yield

Table S3 Estimated parameters and standard errors (SE) of different functions and quantiles for fat percentage

Table S4 Estimated parameters and standard errors (SE) of different functions and quantiles for protein percentage

Table S5 Estimated parameters and standard errors (SE) for different functions and quantiles for somatic cell score

Table S1

Number of monthly records	101,051
Number of herds	183
Number of cows	13,977
Average \pm SD of days in milk (d)	133 \pm 79
Average \pm SD of milk yield (kg)	30.16 \pm 6.75
Average \pm SD of fat percent (%)	3.35 \pm 0.83
Average \pm SD of protein percent (%)	3.06 \pm 0.37
Average \pm SD of SCS (cells/ml)	4.47 \pm 1.42
Average \pm SD of age at first calving (month)	25.69 \pm 2.42

Table S2

Function	Parameter	Q25	SE	Q50	SE	Q75	SE
Wood	<i>A</i>	14.80	0.18	18.02	0.13	21.11	0.13
	<i>B</i>	0.19	0.004	0.18	0.003	0.16	0.002
	<i>C</i>	0.002	0.00	0.002	0.00	0.002	0.00
Wilmink	<i>A</i>	31.71	0.12	35.9	0.05	39.52	0.1
	<i>B</i>	-14.97	0.29	-15.43	0.17	-15.68	0.3
	<i>C</i>	-0.03	0.00	-0.03	0.00	-0.03	0.00
Ali & Schaeffer	<i>A</i>	47.37	2.9	59.98	3.2	58.6	3.8
	<i>B</i>	-34.19	4.8	-48.13	5.8	-38.6	6.3
	<i>C</i>	8.35	2.0	14.23	2.6	11.6	2.7
	<i>D</i>	-8.41	1.6	-12.79	1.73	-9.9	2.04
	<i>G</i>	0.41 ^{ns}	0.24	0.97	0.24	0.5 ^{ns}	0.3
Dijkstra	<i>A</i>	17.96	0.2	21.06	0.2	24.2	0.3
	<i>B</i>	0.03	0.001	0.03	0.00	0.03	0.001
	<i>c</i>	0.05	0.001	0.05	0.001	0.05	0.002
	<i>d</i>	0.001	0.00	0.001	0.00	0.009	0.00

Table S3

Function	Parameter	Q25	SE	Q50	SE	Q75	SE
Wood	<i>a</i>	4.45	0.06	5.45	0.05	6.54	0.06
	<i>b</i>	-0.15	0.004	-0.15	0.003	-0.16	0.003
	<i>c</i>	-0.002	0.00	-0.001	0.00	-0.002	0.00
Wilmink	<i>a</i>	2.42	0.010	2.94	0.009	3.41	0.010
	<i>b</i>	1.41	0.04	1.69	0.04	2.07	0.04
	<i>c</i>	0.002	0.00	0.002	0.00	0.002	0.00
Ali & Schaeffer	<i>a</i>	0.42	0.35	1.06	0.30	0.94*	0.41
	<i>b</i>	3.82	0.56	3.66	0.482	4.59	0.68
	<i>c</i>	-1.13	0.23	-1.14	0.20	-1.46	0.29
	<i>d</i>	1.07	0.197	0.95	0.170	1.27	0.230
	<i>g</i>	-0.08	0.03	-0.04 ^{ns}	0.026	-0.07*	0.034
Dijkstra	<i>a</i>	3.79	0.05	4.66	0.05	5.47	0.04
	<i>b</i>	-0.02	0.001	-0.02	0.001	-0.02	0.001
	<i>c</i>	0.04	0.002	0.04	0.001	0.04	0.001
	<i>d</i>	-0.0009	0.00	-0.0007	0.00	-0.0006	0.00

Table S4

Function	Parameter	Q25	SE	Q50	SE	Q75	SE
Wood	<i>a</i>	3.26	0.017	3.57	0.02	3.97	0.014
	<i>b</i>	-0.06	0.001	-0.07	0.001	-0.07	0.001
	<i>c</i>	-0.001	0.000	-0.001	0.000	-0.001	0.000
Wilmink	<i>a</i>	2.56	0.004	2.73	0.003	2.93	0.003
	<i>b</i>	0.56	0.01	0.65	0.013	0.77	0.012
	<i>c</i>	0.002	0.000	0.002	0.000	0.002	0.000
Ali & Schaeffer	<i>a</i>	2.87	0.13	3.43	0.12	3.68	0.13
	<i>b</i>	0.56	0.21	0.02 ^{ns}	0.20	-0.06 ^{ns}	0.22
	<i>c</i>	-0.41	0.09	-0.21 [*]	0.08	-0.17 ^{ns}	0.10
	<i>d</i>	-0.33	0.07	-0.58	0.07	-0.61	0.08
	<i>g</i>	0.10	0.01	0.15	0.01	0.18	0.01
Dijkstra	<i>a</i>	3.75	0.04	4.19	0.05	4.45	0.06
	<i>b</i>	-0.04	0.002	-0.05	0.002	-0.04	0.003
	<i>c</i>	0.10	0.003	0.11	0.003	0.11	0.004
	<i>d</i>	-0.0005	0.00	-0.0005	0.00	-0.0005	0.00

Table S5

Function	Parameter	Q25	SE	Q50	SE	Q75	SE
Wood	<i>a</i>	4.87	0.06	5.63	0.08	6.52	0.04
	<i>b</i>	-0.12	0.004	-0.10	0.004	-0.05	0.002
	<i>c</i>	-0.001	0.000	-0.001	0.000	-0.0005	0.000
Wilmink	<i>a</i>	1.96	0.04	2.36	0.07	4.54	0.2
	<i>b</i>	2.00	0.04	2.31	0.08	1.48	0.1
	<i>c</i>	0.28	0.008	0.36	0.007	0.21	0.03
Ali & Schaeffer	<i>a</i>	1.78	0.39	2.73	0.52	2.68	0.73
	<i>b</i>	2.87	0.64	2.75	0.87	5.19	1.27
	<i>c</i>	-1.14	0.27	-1.06	0.37	-2.22	0.59
	<i>d</i>	0.56	0.22	0.43 ^{ns}	0.29	1.39	0.38
	<i>g</i>	0.003 ^{ns}	0.03	0.03 ^{ns}	0.04	-0.14	0.05
Dijkstra	<i>a</i>	4.55	0.06	5.38	0.10	6.29	0.06
	<i>b</i>	-0.02	0.001	-0.02	0.002	-0.008	0.002
	<i>c</i>	0.06	0.003	0.06	0.005	0.05	0.01
	<i>d</i>	-0.0005	0.000	-0.0005	0.000	-0.0002	0.000

Supplementary Figure legends

Supplementary Figures

Figure S1 Wood lactation curves for milk yield across quantiles

Figure S2 Ali & Schaeffer lactation curves for milk yield across quantiles

Figure S3 Dijkstra lactation curves for milk yield across quantiles

Figure S4 Wood lactation curves for fat percentage across quantiles

Figure S5 Wilmink lactation curves for fat percentage across quantiles

Figure S6 Ali & Schaeffer lactation curves for fat percentage across quantiles

Figure S7 Wood lactation curves for protein percentage across quantiles

Figure S8 Wilmink lactation curves for protein percentage across quantiles

Figure S9 Dijkstra lactation curves for protein percentage across quantiles

Figure S10 Wood lactation curves for somatic cell score across different quantiles

Figure S11 Wilmink lactation curves for somatic cell score across different quantiles

Figure S12 Ali & Schaeffer lactation curves for somatic cell score across different quantiles

Figure S13 Dijkstra lactation curves for somatic cell score across different quantiles

























