

1 **Table S1 Statistics of pair-wise post hoc tests between an nual-cycle stages by genotypic group.** In the comparison among genotypic groups the
 2 interaction term genotypic group*annual-cycle stage was not significant for haptoglobin, and results are not shown.

	Kazakh		Kazakh x European		European		European x Kenyan		Kenyan	
	z -value	P	z -value	P	z -value	P	z -value	P	z -value	P
Hemagglutination										
Spring-Breeding	0.40	0.99	1.09	0.81	2.25	0.15	1.41	0.61	0.31	1.00
Breeding-Moult	0.65	0.97	0.79	0.93	1.48	0.57	1.26	0.71	1.01	0.85
Moult-Autumn	2.78	0.04*	3.97	<0.001**	0.91	0.89	2.03	0.25	0.98	0.86
Autumn-Winter	3.62	0.003**	3.68	0.002**	0.67	0.96	2.80	0.04*	0.25	1.00
Winter-Spring	0.32	1.00	1.48	0.57	0.24	1.00	3.19	0.01*	0.14	1.00
Spring-Moult	0.39	0.99	2.18	0.18	0.59	0.98	2.54	0.08	1.33	0.67
Breeding-Autumn	3.19	0.01*	2.78	0.04*	2.23	0.16	0.81	0.92	0.02	1.00
Moult-Winter	0.17	1.00	1.15	0.77	0.43	0.99	0.29	1.00	1.41	0.62
Spring-Autumn	3.65	0.002**	2.11	0.21	0.49	0.99	0.64	0.97	0.33	1.00
Breeding -Winter	0.62	0.97	0.08	1.00	2.15	0.19	1.81	0.36	0.23	1.00
Hemolysis										
Spring-Breeding	1.38	0.63	0.41	0.99	2.40	0.11	0.71	0.95	0.19	1.00
Breeding-Moult	0.30	1.00	0.10	1.00	0.52	0.99	0.35	1.00	0.17	1.00
Moult-Autumn	5.95	<0.001**	3.12	0.02*	3.36	0.007**	0.96	0.87	1.63	0.47
Autumn-Winter	7.56	<0.001**	3.90	<0.001**	3.80	0.001**	2.38	0.12	1.82	0.36
Winter-Spring	2.15	0.19	0.84	0.91	3.95	< 0.001**	2.24	0.16	0.13	1.00
Spring-Moult	1.27	0.70	0.59	0.98	3.00	0.02*	1.01	0.85	0.02	1.00
Breeding-Autumn	5.51	<0.001**	2.71	0.051	2.82	0.04*	0.64	0.97	1.82	0.36
Moult-Winter	0.40	1.00	0.07	1.00	0.15	1.00	1.18	0.76	0.14	1.00
Spring-Autumn	5.51	<0.001**	2.81	0.04*	0.99	0.85	0.12	1.00	1.67	0.45
Breeding -Winter	0.02	1.00	0.18	1.00	0.45	0.99	1.63	0.47	0.33	1.00

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4 **Table S1 continued**

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	Kazakh		Kazakh x European		European		European x Kenyan		Kenyan	
	z -value	P	z -value	P	z -value	P	z -value	P	z -value	P
Bactericidal ability against <i>E.coli</i>										
Spring-Breeding	0.82	0.92	4.71	<0.001**	5.02	<0.001**	4.28	<0.001**	2.12	0.20
Breeding-Moult	0.23	1.00	0.22	1.00	0.11	1.00	1.49	0.56	1.71	0.42
Moult-Autumn	4.48	<0.001**	1.34	0.66	1.80	0.37	1.85	0.34	0.80	0.93
Autumn-Winter	5.09	<0.001**	1.45	0.59	1.62	0.48	2.49	0.09	3.86	0.001**
Winter-Spring	1.99	0.27	4.84	<0.001**	5.21	<0.001**	5.95	<0.001**	4.01	<0.001**
Spring-Moult	1.17	0.76	4.97	<0.001**	4.73	<0.001**	2.71	0.05	0.49	0.99
Breeding-Autumn	3.32	0.008**	0.96	0.87	1.73	0.41	0.58	0.98	0.95	0.87
Moult-Winter	0.49	0.99	0.09	1.00	0.46	0.99	4.20	<0.001**	4.31	<0.001**
Spring-Autumn	3.12	0.02*	3.38	0.006**	2.36	0.12	4.15	<0.001**	1.17	0.77
Breeding -Winter	0.69	0.96	0.15	1.00	0.36	1.00	3.07	0.0177 *	2.84	0.03*
Bactericidal ability against <i>S.aureus</i>										
Spring-Breeding	2.82	0.04*	1.24	0.73	2.22	0.17	0.28	1.00	0.16	1.00
Breeding-Moult	2.88	0.03*	1.43	0.60	0.78	0.94	3.27	0.009**	2.53	0.08
Moult-Autumn	3.47	0.005**	2.56	0.08	2.45	0.10	2.46	0.10	3.23	0.01 *
Autumn-Winter	2.50	0.09	0.54	0.98	0.47	0.99	1.81	0.36	0.32	1.00
Winter-Spring	2.24	0.16	1.75	0.40	0.51	0.99	0.67	0.96	0.66	0.96
Spring-Moult	0.60	0.97	0.29	1.00	2.96	0.03*	2.81	0.04*	1.91	0.31
Breeding-Autumn	5.73	<0.001**	0.83	0.92	1.75	0.40	0.43	0.99	0.90	0.90
Moult-Winter	1.18	0.76	2.18	0.18	2.30	0.14	4.52	<0.001**	3.27	0.009**
Spring-Autumn	4.36	<0.001**	2.04	0.24	0.09	1.00	0.55	0.98	0.85	0.91
Breeding -Winter	4.31	<0.001**	0.45	0.99	1.53	0.53	1.34	0.65	0.67	0.96

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8 **Table S2 Statistics of pair-wise post hoc tests between annual-cycle stages by treatment group.** In the comparison between treatment groups the
 9 interaction annual-cycle stage*treatment was significant for hemolysis and bactericidal ability against *E.coli*, and we only performed a post-hoc test on
 10 these indices.

	Temperature treatment			
	Constant		Variable	
	z -value	P	z -value	P
Hemolysis				
Spring-Breeding	2.40	0.11	0.64	0.97
Breeding-Moult	0.52	0.99	0.47	0.99
Moult-Autumn	3.36	0.007**	2.13	0.20
Autumn-Winter	3.80	0.001**	0.40	0.99
Winter-Spring	3.95	< 0.001**	0.71	0.95
Spring-Moult	3.00	0.02*	1.13	0.79
Breeding-Autumn	2.82	0.04*	1.54	0.53
Moult-Winter	0.15	1.00	2.42	0.11
Spring-Autumn	0.99	0.85	0.93	0.88
Breeding -Winter	0.45	0.99	1.58	0.50
Bactericidal ability against <i>E.coli</i>				
Spring-Breeding	5.02	<0.001**	2.89	0.03*
Breeding-Moult	0.11	1.00	1.91	0.31
Moult-Autumn	1.79	0.37	0.40	0.99
Autumn-Winter	1.62	0.48	0.53	0.98
Winter-Spring	5.21	<0.001**	5.05	<0.001**
Spring-Moult	4.73	<0.001**	4.79	<0.001**
Breeding-Autumn	1.73	0.41	1.43	0.61
Moult-Winter	0.46	0.99	0.13	1.00
Spring-Autumn	2.36	0.12	4.52	<0.001**
Breeding -Winter	0.36	1.00	1.95	0.29