

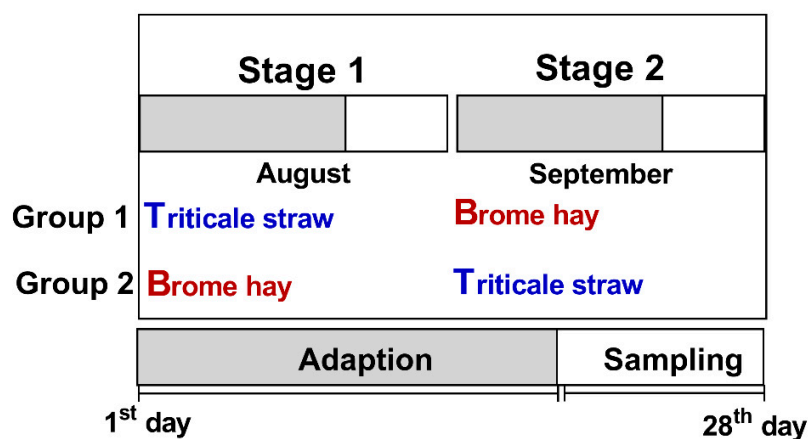
**Table S1.** Comparison of chemical composition between triticale straw and brome hay (% dry matter)

Component, %	Triticale straw	Brome hay	<i>P</i> value
Dry Matter	87.8 ± 3.91	87.5 ± 2.65	0.220
Neutral Detergent Fiber	83.7 ± 3.49*	69.9 ± 0.29	0.002
Acid Detergent Fiber	52.2 ± 3.66*	37.8 ± 0.31	0.003
Cellulose	43.7 ± 2.73*	32.7 ± 0.51	0.013
Hemicellulose	31.8 ± 1.63	31.8 ± 1.63	0.170
Lignin	7.4 ± 1.30	4.9 ± 0.82	0.090
Nitrogen	0.67 ± 0.11*	1.12 ± 0.10	0.001

**Table S2.** Summary of sequencing output

Feeds	Animals	Sample ID	Total reads	LSU		SSU	
				Hit Reads number	% of total reads	Hit Reads number	% of total reads
1 <sup>st</sup> triticales straw	Odin	777	240,614	119,883	49.82	120,725	50.17
	Carter	789	279,030	138,232	49.54	140,797	50.46
	Yessey	783	1,786,228	1,059,874	59.34	725,136	40.60
	Willie	797	375,027	188,342	50.22	186,683	49.78
2 <sup>nd</sup> brome hay	Odin	1,014	1,047,269	560,762	53.55	485,745	46.38
	Carter	1,004	85,868	41,679	48.54	44,003	51.24
	Yessey	1,023	637,292	275,425	43.22	360,897	56.63
	Willie	1,021	879,880	493,437	43.82	385,528	56.08
1 <sup>st</sup> brome hay	Bernie	771	875,018	495,986	56.68	378,312	43.23
	Kobuk	791	1,241,700	501,858	40.42	737,229	59.37
	Tyr	780	1,899,935	1,005,533	52.92	893,413	47.02
2 <sup>nd</sup> triticales straw	Bernie	1,001	60,949	29,462	48.34	31,483	51.65
	Kobuk	1,008	366,827	178,812	48.75	188,011	51.25
	Tyr	1,018	1,268,690	649,566	51.20	619,122	48.80

LSU: Large Subunit rRNA; SSU: Small Subunit rRNA.



**Figure S1** Schematic presentation of a crossover design, 8 castrated muskoxen with ruminal cannulas were housed in individual pens and assigned into two groups based on their initial body mass ( $268 \pm 18.4$  kg vs.  $278 \pm 27.2$  kg), and ad libitum fed with triticale (*Triticosecale hexaploide*) straw as a low-quality diet or brome (*Bromus spp.*) hay as a medium-quality diet from August to September