



Open Access

Asian Australas. J. Anim. Sci.

Vol. 28, No. 6 : 903-910 June 2015

<http://dx.doi.org/10.5713/ajas.14.0385>

www.ajas.info

pISSN 1011-2367 eISSN 1976-5517

Modelling Pasture-based Automatic Milking System Herds: System Fitness of Grazeable Home-grown Forages, Land Areas and Walking Distances

M. R. Islam*, S. C. Garcia, C. E. F. Clark, and K. L. Kerrisk

Dairy Science Group, Faculty of Veterinary Science, The University of Sydney, Camden, NSW 2570, Australia

- Supplementary Data -

TABLE OF CONTENTS

Supplementary Table S1.....	2
Supplementary Table S2.....	3
Supplementary Table S3.....	4
Supplementary Table S4.....	5

Supplementary Table S1. Areas (ha) required for different herd sizes in moderate (15 t DM/ha) pasture utilisation at AMS

Herd size (n)	Pasture (%)	100	90	80	70	60	50
	CFR (%)	0	10	20	30	40	50
	Areas (ha)	Supply of forages (1 = supply of 50% of ME of total diets)					
400	50	0.50	0.55	0.59	0.64	0.68	0.72
	70	0.70	0.77	0.83	0.89	0.95	1.01
	80	0.80	0.88	0.95	1.02	1.09	1.16
	90	0.91	0.99	1.06	1.14	1.22	1.30
	100	1.01	1.09	1.18	1.27	1.36	1.45
	140	1.41	1.53	1.66	1.78	1.90	2.03
	150	1.51	1.64	1.77	1.91	2.04	2.17
	160	1.61	1.75	1.89	2.03	2.18	2.32
	170	1.71	1.86	2.01	2.16	2.31	2.46
	180	1.81	1.97	2.13	2.29	2.45	2.61
	190	1.91	2.08	2.25	2.42	2.58	2.75
	200	2.01	2.19	2.37	2.54	2.72	2.90
	300	3.02	3.28	3.55	3.81	4.08	4.35
	400	4.02	4.38	4.73	5.09	5.44	5.79
	500	5.03	5.47	5.92	6.36	6.80	7.24
600	50	0.34	0.36	0.39	0.42	0.45	0.48
	100	0.67	0.73	0.79	0.85	0.91	0.97
	110	0.74	0.80	0.87	0.93	1.00	1.06
	120	0.80	0.88	0.95	1.02	1.09	1.16
	130	0.87	0.95	1.03	1.10	1.18	1.26
	140	0.94	1.02	1.10	1.19	1.27	1.35
	150	1.01	1.09	1.18	1.27	1.36	1.45
	200	1.34	1.46	1.58	1.70	1.81	1.93
	300	2.01	2.19	2.37	2.54	2.72	2.90
	400	2.68	2.92	3.15	3.39	3.63	3.86
500	3.35	3.65	3.94	4.24	4.53	4.83	
800	50	0.25	0.27	0.30	0.32	0.34	0.36
	100	0.50	0.55	0.59	0.64	0.68	0.72
	140	0.70	0.77	0.83	0.89	0.95	1.01
	150	0.75	0.82	0.89	0.95	1.02	1.09
	160	0.80	0.88	0.95	1.02	1.09	1.16
	170	0.86	0.93	1.01	1.08	1.16	1.23
	180	0.91	0.99	1.06	1.14	1.22	1.30
	190	0.96	1.04	1.12	1.21	1.29	1.38
	200	1.01	1.09	1.18	1.27	1.36	1.45
	300	1.51	1.64	1.77	1.91	2.04	2.17
400	2.01	2.19	2.37	2.54	2.72	2.90	
500	2.51	2.74	2.96	3.18	3.40	3.62	

Supplementary Table S2. Areas (ha) required for different herd sizes in high pasture (19.7 t DM/ha) utilisation at AMS

Herd size (n)	Pasture (%)	100	90	80	70	60	50
	CFR (%)	0	10	20	30	40	50
	Areas (ha)	Supply of forages (1 = supply of 50% of ME of total diets)					
400	50	0.66	0.69	0.72	0.75	0.77	0.80
	70	0.92	0.96	1.00	1.04	1.08	1.12
	80	1.06	1.10	1.15	1.19	1.24	1.28
	100	1.32	1.38	1.44	1.49	1.55	1.61
	130	1.72	1.79	1.87	1.94	2.01	2.09
	140	1.85	1.93	2.01	2.09	2.17	2.25
	150	1.98	2.07	2.15	2.24	2.32	2.41
	160	2.11	2.21	2.30	2.39	2.48	2.57
	200	2.64	2.76	2.87	2.98	3.10	3.21
	250	3.30	3.45	3.59	3.73	3.87	4.02
	300	3.96	4.13	4.31	4.48	4.65	4.82
600	400	5.28	5.51	5.74	5.97	6.20	6.42
	500	6.61	6.89	7.18	7.46	7.75	8.03
	50	0.44	0.46	0.48	0.50	0.52	0.54
	60	0.53	0.55	0.57	0.60	0.62	0.64
	70	0.62	0.64	0.67	0.70	0.72	0.75
	80	0.70	0.74	0.77	0.80	0.83	0.86
	90	0.79	0.83	0.86	0.90	0.93	0.96
	100	0.88	0.92	0.96	0.99	1.03	1.07
	110	0.97	1.01	1.05	1.09	1.14	1.18
	120	1.06	1.10	1.15	1.19	1.24	1.28
	190	1.67	1.75	1.82	1.89	1.96	2.03
800	200	1.76	1.84	1.91	1.99	2.07	2.14
	300	2.64	2.76	2.87	2.98	3.10	3.21
	400	3.52	3.68	3.83	3.98	4.13	4.28
	500	4.40	4.59	4.78	4.97	5.16	5.35
	50	0.33	0.34	0.36	0.37	0.39	0.40
	100	0.66	0.69	0.72	0.75	0.77	0.80
	110	0.73	0.76	0.79	0.82	0.85	0.88
	120	0.79	0.83	0.86	0.90	0.93	0.96
	130	0.86	0.90	0.93	0.97	1.01	1.04
	140	0.92	0.96	1.00	1.04	1.08	1.12
	150	0.99	1.03	1.08	1.12	1.16	1.20
160	1.06	1.10	1.15	1.19	1.24	1.28	
200	1.32	1.38	1.44	1.49	1.55	1.61	
300	1.98	2.07	2.15	2.24	2.32	2.41	
400	2.64	2.76	2.87	2.98	3.10	3.21	
500	3.30	3.45	3.59	3.73	3.87	4.02	

Supplementary Table S3. Walking distances (m) required in different farm areas

%paddocks→	7	13	20	13	20	13	13
m/ha→	2	2	5	6	8	9	12
Total area (ha)↓	Distance walked (m)						
50	83	92	245	275	398	428	582
70	117	128	343	385	558	600	814
80	133	147	392	440	637	685	931
81	135	149	397	446	645	694	942
82	137	150	402	451	653	702	954
83	138	152	407	457	661	711	966
84	140	154	412	462	669	720	977
85	142	156	417	468	677	728	989
86	143	158	421	473	685	737	1000
90	150	165	441	495	717	771	1047
100	167	183	490	550	797	857	1163
110	183	202	539	605	876	942	1280
120	200	220	588	660	956	1028	1396
130	217	238	637	715	1036	1114	1512
140	233	257	686	770	1115	1199	1629
150	250	275	735	825	1195	1285	1745
160	267	293	784	880	1275	1371	1861
170	283	312	833	935	1354	1456	1978
180	300	330	882	990	1434	1542	2094
190	317	348	931	1045	1514	1628	2210
200	333	367	980	1100	1593	1713	2327
250	417	458	1225	1375	1992	2142	2908
260	433	477	1274	1430	2071	2227	3025
300	500	550	1470	1650	2390	2570	3490
350	583	642	1715	1925	2788	2998	4072
400	667	733	1960	2200	3187	3427	4653
430	717	788	2107	2365	3426	3684	5002
440	733	807	2156	2420	3505	3769	5119
450	750	825	2205	2475	3585	3855	5235
500	833	917	2450	2750	3983	4283	5817

Supplementary Table S4. Range of walking distances (km) required in different farm areas

Areas (ha)	up to 1 km	>1-2 km	>2-3 km	>3-4 km	>4-5 km	>5 km
50	100					
60	100					
70	100					
80	100					
90	87	13				
100	87	13				
110	87	13				
120	73	27				
130	53	47				
140	53	47				
150	53	47				
160	53	47				
170	53	47				
180	53	33	13			
190	40	47	13			
200	40	47	13			
210	20	67	13			
220	20	67	13			
230	20	67	13			
240	20	53	27			
250	20	53	27			
260	20	33	34	13		
270	20	33	34	13		
280	20	33	34	13		
290	20	33	34	13		
300	20	33	34	13		
400	20	20	13	33	14	
500	20		33	20	13	14