

Table S1. Summary of the main characteristics of the 84 studies published between 2000 and 2020 on the use of GPS tracking on cattle to determine the factors affecting their site use preference on grazing systems.

Reference	Years of study		Agroecosystem			Area	Herd and GPS collars			Factors assessed			Response variables (only related to distribution)																								
	Start	End	System type	Climate	Location		Average area (ha)	Average herd size	Average number of animals tracked	% Animals tracked	Breed/biotype/age	Physiological status/age	Phenotypic/genotypic traits	Previous experience	Social dominance	Topography/slope/elevation/insolation/visibility	Ground conditions: cover of rocks, soil moisture	Supplement: distance from/type	Water: distance to/elevation of	Distance to fence/shed/cattle tracks/roads	Shade: distribution/distance to/shelter type	Pasture size/herd size/stocking rate	Vegetation: units/groups, composition, heterogeneity, sparse/forage	Trees: density, canopy cover, cutting age, burned area	Herbage quality	Landscape/vegetation greenness (NDVI)	Grazing management, stocking intensity, stocking date, herder presence	Day vs Night	Environment: temperature, atmospheric pressure, weather, season	Travel (distance/intensity/rate/path/area covered)	Time foraging/grazing	Time foraging or resting area/intensity	Forage utilisation/grazing intensity	Elevation/slope of terrain used	Distance to roads/cattle tracks/fences	Tortuosity/crockedness of grazing pathways	Dispersion-aggregation pattern/stocking density
Aharoni et al. (2013)	2006	2007	Hilly grassland	Mediterranean	Israel	28	16.5	16.5	100	Beef cows	300	x																									
Anderson et al. (2012)	2009	2011	Rangeland	Semi-desert	USA	433	21	8.5	58.3	Beef cows	1		x																								
Augustine and Derner (2014)	2007	2011	Rangeland	Semi-arid	USA	65		3.0		Steers	300					x																					
Bailey et al. (2001)	1998	1999	Foothills rangeland	Semi-arid	USA	288	159	81.0	50.9	Beef cows	600					x	x	x																			
Bailey et al. (2004)	1998	1998	Foothills rangeland	Semi-arid	USA	337	160	9.0	5.6	Beef cows	600, 1200		x																								
Bailey et al. (2008)	2004	2004	Foothills rangeland	Semi-arid	USA	294	98	9.0	9.2	Beef cows	600					x																					
Bailey et al. (2010)	2005	2006	Rangeland	Desert	USA	2210	7	1.0	14.3	Beef cows	600			x																							
Bailey et al. (2016)	2013	2014	Rangeland	Continental humid	USA	1210	300	20.5	6.8	Beef cows	600		x																								
Bailey and Jensen (2008)	2002	2002	Foothills rangeland	Semi-arid	USA	294	80	22.5	28.1	Beef cows	600					x																					
Bailey and Welling (2007) Study 1	2000	2000	Foothills rangeland	Semi-arid	USA	147	214	10.0	4.7	Beef cows	600					x	x																				
Bailey and Welling (2007) Study 2	2001	2002	Foothills rangeland	Semi-arid	USA	213	167	25.0	15.1	Beef cows	600					x																					
Bailey, Lunt et al. (2015)	2009	2013	Rangeland, mountainous and/or extensive pasture	Semi-arid	USA	2648	113	16.7	21.2	Beef cows	600		x																		x	x					
Bailey, Stephenson et al. (2015)	2010	2012	Rangeland, mountainous and/or extensive pasture	Semi-arid	USA	2318	344	15.4	10.1	Beef cows	600, 900			x																							
Bear et al. (2012) Study 1	2007	2009	Rangeland	Continental humid	USA	58	42	2.5	7.6	Beef cows	600					x																					
Bear et al. (2012) Study 2	2009	2009	Rangeland	Continental humid	USA	11	17	2.5	16.2	Beef heifers	600					x																					
Browning et al. (2018)	2008	2008	Rangeland	Desert	USA	1525	10	7.3	70.1	Beef cows	300					x																	x				
Byers et al. (2005)	2001	2001	Riparian pasture	Subtropical	USA	16	20	3.0	15.0	Beef cows	300					x																x					
Cheleuitte-Nieves et al. (2018)	2008	2009	Rangeland	Semi-arid	USA	100	10	10.0	100	Beef cows	300			x																x							
Cheleuitte-Nieves et al. (2020)	2007	2008	Rangeland	Semi-arid	USA	457	31	11.0	35	Beef cows	300			x	x	x														x							
Clark et al. (2014)	2003	2009	Rangeland	Semi-arid	USA	324	800	10.0	1.3	Beef cows	600					x															x						
Cooper et al. (2008)	2005	2006	Rangeland	Semi-arid	USA	1651	60	9.0	15.0	Beef cows	300					x														x							
Diaz Falu et al. (2014)	2009	2011	Grassland	Sub-tropical	Argentina	128	64	7.0	10.9	Beef cows & ewes	600			x	x	x	x											x									
Eikelboom et al. (2020)	2017	2017		Temperate oceanic	Netherlands	1	8	8.0	100.0	Dairy cows	1					x															x						
Ganskopp (2001)	1999	1999	Rangeland	Arid	USA	842	40	2.0	5.0	Beef cows	600					x	x													x							
Ganskopp and Bohnert (2009)	2004	2004	Rangeland	Arid	USA	847	20	4.0	20.0	Beef cows	300					x	x													x							
Gonzalez et al. (2014)	2013	2014	Open woodland	Tropical savannah	Australia	15	30	20.0	66.7	Steers	10																	x	x								
Gou et al. (2020)	2018	2018	Lowland grassland and dunes areas	Semi-arid	China	20	13	13.0	100.0		50					x														x							
Haan et al. (2010)	2005	2007	Grassland with trees	Continental humid	USA	12	15	1.0	6.7	Beef cows	600					x													x								
Halasz et al. (2016)	2010	2013	Rangeland	Continental humid	Hungary	1191	200	10.0	5.0	Beef cows						x													x								
Henkin et al. (2012)	2002	2003	Hilly grassland	Mediterranean	Israel	28	23	3.8	18.0	Beef cows	300					x	x													x							
Hessle et al. (2008)	2004	2004	Semi-natural grassland	Mediterranean	Sweden	18	14	12.0	85.7	Beef heifers	15	x				x												x	x								
Homburger et al. (2015)	2011	2012	Upland grassland	Alpine	Switzerland	84	57	2.8	5.7	Beef cows and dairy cows	20					x		x	x	x	x				x		x	x		x							
Hunt et al. (2007)	2003	2006	Rangeland	Semi-arid	Australia	3																															

Sant'Anna et al. (2015)	2007	2007	Semi-natural grassland	Continental humid	Sweden	64	26	1.0	3.8	Beef cows	300			x	x		x			x	x	x	x	x
Šárová et al. (2010)	2005	2005	Grassland	Continental	Czech Republic	2.3	15	15.0	100.0	Beef cows	1			x						x	x			
Sather et al. (2013)	2009	2010	Grassland	Continental humid and Subtropical humid	USA	21	28	3.0	13.9	Beef cows	3600					x								x
Sawalhah et al. (2014)	2004	2007	Woodland/Grassland	Semi-arid	USA	146	50	13.0	54.9	Beef cows	300			x	x	x	x	x	x	x	x	x	x	
Sawalhah et al. (2016)	2004	2007	Woodland/Grassland	Semi-arid	USA	146	50	13.0	54.9	Beef cows	300								x	x	x	x	x	x
Schlecht et al. (2004)	1998	1998	Livestock-crop rotation	Semi-arid	Nigeria			14.0		Beef cows	10							x	x	x	x			
Schlecht et al. (2006)	1997	1999	Livestock-crop rotation	Semi-arid	Nigeria	29800		12.0		Beef cows, sheep and goats	10					x	x	x	x	x	x	x	x	
Schoenbaum et al. (2017)	2007	2009	Oak woodland	Mediterranean	Israel	53	24	8.0	37.8	Beef cows	300			x		x	x	x	x	x	x	x	x	
Schwarte et al. (2011)	2008	2009	Grassland with trees	Continental humid	USA	12	15	1.0	6.7	Beef cows	600			x			x	x	x	x	x	x	x	x
Sickel et al. (2004)	2000	2000	Semi-natural mountain grassland	Transitional	Norway	14	1.0	7.2		Dairy cows								x	x	x	x	x	x	x
Spedener et al. (2019)	2017	2017	South-boreal forest (coniferous)	Continental	Norway	13500	740	16.0	2.2	Beef cows and sheep	300			x		x	x			x	x	x		
Spiegel et al. (2019)	2008	2008	Rangeland	Desert	USA	1535	11	10.1	92.8	Beef cows	300	x				x			x	x	x	x	x	
Sprinkle et al. (2020)	2015	2015	Rangeland	Continental	USA	323	30	10.0	33.3	Beef cows	120		x						x			x		
Stephenson and Bailey (2017)	2010	2012	Rangeland	Desert, semi-arid	USA	2318	130	14.8	17.0	Beef cows	600, 900			x	x	x	x							
Thomas et al. (2011)	2008	2008	Rangeland	Mediterranean	Australia	41	109	6.0	5.6	Beef heifers	300	x	x						x	x				
Thompson et al. (2015)	2004	2005	Foothill grassland (<i>Stipa-poa</i> zone)	Continental	Canada	65	30	7.0	23.3	Beef cows	300					x			x	x	x	x	x	
Tofastrud et al. (2019)	2015	2017	South-boreal forest (coniferous)	Continental	Norway	12500		52.0		Beef cows	300, 600			x	x	x	x			x	x			
Tofastrud et al. (2020)	2015	2017	South-boreal forest (coniferous)	Continental	Norway	12500	336	53.0	15.8	Beef cows	300		x						x	x				
Tomkins et al. (2009)	2004	2006	Rangeland	Subtropical Savanna	Australia	105	27	3.0	12.6	Beef Steers	1800, 3600				x	x	x	x	x	x	x	x	x	
Tomkins and O'Reagain (2007)	2005	2006	Rangeland	Subtropical Savanna	Australia	1530	183	12.0	6.6	Beef cows	1800			x		x	x	x	x	x	x	x	x	
Turner et al. (2000)	1997	1998	Pasture	Subtropical humid	USA	6	24	7.0	29.2	Beef cows and steers	300							x	x	x	x	x	x	x
Van Laer, Ampe et al. (2015)	2011	2014	Natural reserve	Temperate oceanic	Belgium	54	10	1.0	11.6	Beef cows and oxes	900, 1800			x	x		x	x		x	x	x	x	
Van Laer, Moens et al. (2015)	2012	2013	Natural reserve	Temperate oceanic	Belgium	51	10	1.0	11.6	Beef cows and oxes	1800			x	x		x	x		x	x	x	x	
Watnabe et al. (2010)	2005	2005	Pasture and woodland	Continental humid	Japan	3	10	2.0	20.0	Beef cows	600			x			x	x		x	x	x	x	
Wesley et al. (2012)	2006	2007	Rangeland, grassland and woodland	Semi-arid	USA	146	18	18.0	100	Beef cows	300							x	x	x	x	x	x	x
Wyffels et al. (2019)	2015	2017	Rangeland	Semi-arid	USA	68	50	7.0	14.0	Beef heifers	300			x	x		x	x		x	x	x	x	
Wyffels et al. (2020)	2016	2017	Rangeland	Desert, semi-arid	USA	329	287	30.0	10.5	Beef cows	900	x	x	x	x				x	x	x	x	x	x
Zengeya et al. (2013)	2008	2009	Communal land and conservation (savanna)	Semi-arid	Zimbabwe			1.0		Beef cows	3600							x	x		x			
Zengeya et al. (2015)	2009	2010	Communal land	Semi-arid	Zimbabwe			1.0		Beef cows	300							x	x	x	x	x	x	

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