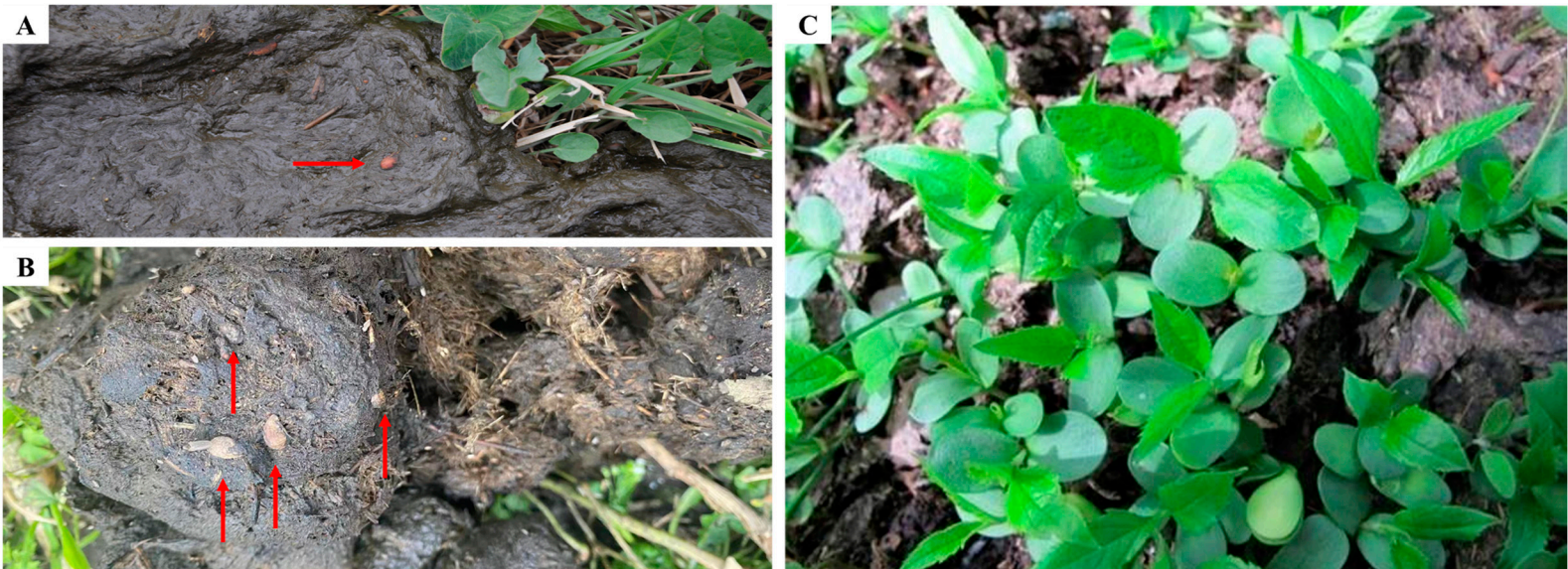


Figure S1. Cattle feces containing *Malus sieversii* seeds and seedlings observed in the wild.



Note: (A) and (B) show that the feces of cattle contain seeds of *M. sieversii*, with the red arrow pointing towards the seeds in the feces; (C) There are *M. sieversii* seedlings growing in cattle feces.

Table S1. Visiting records of various animal species to *Malus sieversii* ground fruits.

Animal species	Type	Total visits	Visits with fruit removal	Visiting behaviors	Consumption time
<i>Bos taurus</i>	B1	564.00	380.00	Passing, fruit consumption	7: 00—23: 00
	B2	524.00	363.00	Passing, fruit consumption, resting	All day
	B3	344.00	202.00	Passing, fruit consumption, resting	7: 00—3: 00
	mean	477.33	315.00		
	SE	67.66	56.71		
<i>Equus caballus caballus</i>	E1	41.00	32.00	Passing, fruit consumption	All day
	E2	31.00	20.00	Passing, fruit consumption	7: 00—22: 00
	E3	87.00	56.00	Passing, fruit consumption	8: 00—20: 00
	mean	53.00	36.00		
	SE	17.24	10.58		
<i>Sus scrofa</i>	S1	45.00	34.00	Passing, fruit consumption	22: 00—8: 00
	S2	39.00	30.00	Passing, fruit consumption	23: 00—7: 00
	S3	36.00	25.00	Passing, fruit consumption	22: 00—8: 00
	mean	40.00	29.67		
	SE	2.65	2.60		
<i>Capreolus pygargus</i>	C1	10.00	5.00	Passing, fruit consumption	21: 00—10: 00
	C2	8.00	6.00	Passing, fruit consumption	22: 00—12: 00
	C3	14.00	2.00	Passing, fruit consumption	1: 00—7: 00
	mean	10.67	4.33		
	SE	1.76	1.20		
<i>Meles meles</i>	M1	4.00	3.00	Passing, fruit consumption	22: 00—4: 00
	M2	9.00	6.00	Passing, fruit consumption	22: 00—8: 00
	M3	16.00	6.00	Passing, fruit consumption	4: 00—8: 00
	mean	9.67	5.00		
	SE	3.48	1.00		
<i>Vulpes vulpes</i>	V1	4.00	0	Passing	
	V2	3.00	0	Passing	
	V3	16.00	0	Passing	
	mean	7.67	0		
	SE	4.18	0		

Table S2. Removal information of 20 *Malus sieversii* fruits placed on the ground by various animals.

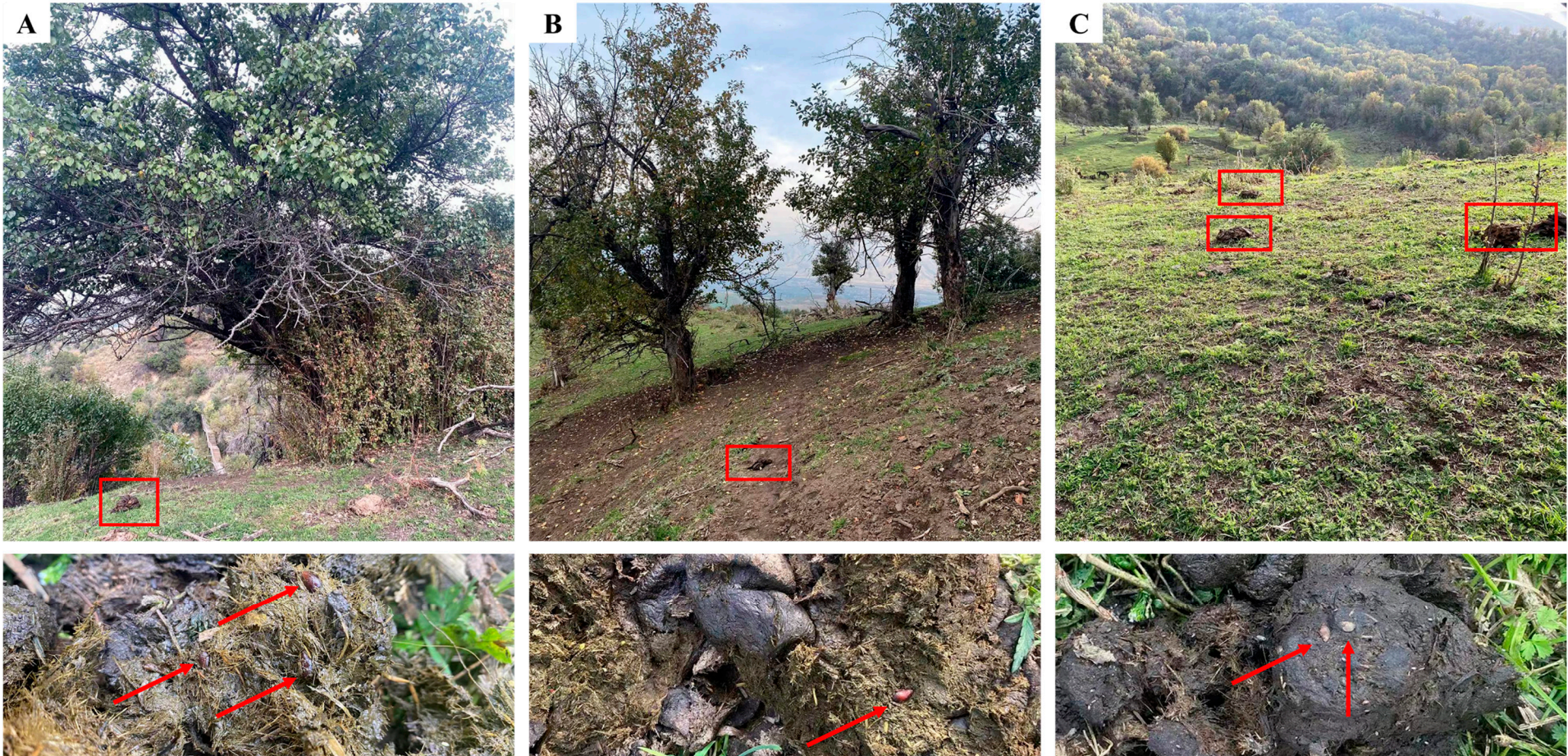
Animal species	Type	Number of fruits removed	Fruits removed (%)
<i>Bos taurus</i>	B1	20.00	100.00
	B2	20.00	100.00
	B3	18.00	90.00
	mean	19.33	96.67
	SE	0.67	3.33
<i>Equus caballus caballus</i>	E1	17.00	85.00
	E2	14.00	70.00
	E3	15.00	75.00
	mean	15.33	76.67
	SE	0.88	4.41
<i>Sus scrofa</i>	S1	18.00	90.00
	S2	20.00	100.00
	S3	18.00	90.00
	mean	18.67	93.33
	SE	0.67	3.33
<i>Capreolus pygargus</i>	C1	3.00	15.00
	C2	4.00	20.00
	C3	2.00	10.00
	mean	3.00	15.00
	SE	0.58	2.89
<i>Meles meles</i>	M1	2.00	10.00
	M2	1.00	5.00
	M3	2.00	10.00
	mean	1.67	8.33
	SE	0.33	1.67
<i>Vulpes vulpes</i>	V1	0.00	0.00
	V2	0.00	0.00
	V3	0.00	0.00
	mean	0.00	0.00
	SE	0.00	0.00

Table S3. Average dispersal distance of cattle to *Malus sieversii* seeds (m).

Time/d	Average daily dispersal distance							Max
	1	2	3	4	5	6	1 — 6	
Cattle1	123.70	100.93	150.43	112.53	105.44	174.84	127.98	533.67
Cattle2	259.03	79.85	61.53	259.77	102.49	153.79	152.74	491.41
Cattle3	125.23	136.73	129.87	115.63	97.48	134.00	123.15	387.80
mean	169.32	105.83	113.94	162.64	101.80	154.21	134.62	
SE	44.86	16.60	26.87	48.57	2.33	11.79	9.16	

Note: Yellow background indicates the farthest distance that cattle can disperse seeds.

Figure S2. *Malus sieversii* seeds dispersed to three habitats by cattle.



Note: (A), (B) and (C) respectively represent three different habitats: understory, gap, and forest edges. The information below corresponds to the presence of seeds in the feces found in each of these habitats. The red box represents cattle feces, while the red arrow pointing towards the seeds in the feces.

Table S4. Average movement distance of cattle every hour (m).

Time/d	Average daily movement distance							Max	Min
	1	2	3	4	5	6	1-6		
cattle1	187.41	245.45	241.13	246.46	202.24	205.13	221.30	616.92	59.45
cattle2	141.45	146.86	157.88	114.32	137.64	118.92	136.18	332.23	27.00
cattle3	153.71	163.05	167.95	235.09	169.47	151.00	173.38	795.98	53.77
mean	160.86	185.12	188.98	198.62	169.79	158.35	176.95		
SE	13.74	30.53	26.23	42.28	18.65	25.16	24.64		

Note: Yellow background indicates the maximum and minimum movement distance of cattle per hour.

Table S5. Average movement distance of cattle at different times (m).

Time/d		1	2	3	4	5	6
Cattle1	15:00-17:00	329.77	344.28	494.06	1233.83	290.77	329.15
	17:00-19:00	244.85	517.08	328.81	861.58	346.48	491.95
	19:00-21:00	318.98	669.92	349.67	468.93	470.86	558.39
	21:00-23:00	316.55	423.11	454.46	437.01	399.81	428.19
	23:00-01:00	355.39	136.34	183.78	122.95	446.51	221.04
	01:00-03:00	206.72	194.47	542.74	395.22	477.96	118.89
	03:00-05:00	235.67	305.49	367.48	164.29	215.78	341.72
	05:00-07:00	167.51	262.72	305.06	159.92	303.83	166.79
	07:00-09:00	360.75	1065.55	568.64	529.53	509.76	745.70
	09:00-11:00	962.07	775.52	1173.21	235.06	685.59	466.51
	11:00-13:00	648.15	916.74	688.76	899.67	426.54	417.64
	13:00-15:00	351.46	279.56	330.36	406.96	279.99	637.12
Cattle2	15:00-17:00	168.18	178.87	366.39	316.04	311.77	136.21
	17:00-19:00	134.05	232.66	310.45	148.70	281.05	191.11
	19:00-21:00	664.46	392.99	368.33	412.69	176.68	302.95
	21:00-23:00	582.13	376.31	395.65	316.48	382.84	450.00
	23:00-01:00	166.29	80.39	152.32	130.06	251.47	190.66
	01:00-03:00	101.86	134.17	180.07	118.05	72.84	285.20
	03:00-05:00	165.16	168.46	209.10	126.13	217.36	195.34
	05:00-07:00	142.07	148.90	264.38	54.00	161.59	201.14
	07:00-09:00	242.94	324.04	412.35	171.00	379.51	136.77
	09:00-11:00	366.33	432.07	606.00	247.35	290.01	378.54
	11:00-13:00	313.81	653.94	392.89	363.77	249.28	219.62
	13:00-15:00	347.52	401.74	131.15	339.33	529.01	166.59
Cattle3	15:00-17:00	170.72	308.58	383.36	723.60	355.00	227.70
	17:00-19:00	260.61	452.82	143.62	584.54	343.46	217.74
	19:00-21:00	404.75	397.63	287.11	410.44	318.23	733.07
	21:00-23:00	312.68	406.60	418.42	436.82	277.95	359.45
	23:00-01:00	207.74	124.72	254.97	162.48	196.22	317.27
	01:00-03:00	185.57	167.16	212.99	150.65	132.93	191.03
	03:00-05:00	131.69	221.36	244.80	253.29	197.04	107.54
	05:00-07:00	213.73	135.45	307.71	317.98	146.34	180.84
	07:00-09:00	315.00	512.92	595.13	271.11	696.29	367.80
	09:00-11:00	383.24	441.41	523.14	321.01	488.01	294.73
	11:00-13:00	591.32	370.69	178.60	1591.97	702.39	298.33
	13:00-15:00	511.95	373.74	480.85	418.16	213.42	328.51
mean	15:00-17:00	222.89	277.24	414.60	757.82	319.18	231.02
	17:00-19:00	213.17	400.85	260.96	531.61	323.66	300.27
	19:00-21:00	462.73	486.85	335.04	430.68	321.92	531.47
	21:00-23:00	403.79	402.01	422.84	396.77	353.53	412.55
	23:00-01:00	243.14	113.81	197.02	138.50	298.07	242.99
	01:00-03:00	164.72	165.27	311.93	221.31	227.91	198.38
	03:00-05:00	177.51	231.77	273.79	181.24	210.06	214.87
	05:00-07:00	174.44	182.35	292.39	177.30	203.92	182.92
	07:00-09:00	306.23	634.17	525.37	323.88	528.52	416.75
	09:00-11:00	570.55	549.67	767.45	267.81	487.87	379.92
	11:00-13:00	517.76	647.12	420.08	951.80	459.41	311.87
	13:00-15:00	403.64	351.68	314.12	388.15	340.81	377.41
SE	15:00-17:00	53.44	50.25	40.03	265.50	18.91	55.72
	17:00-19:00	39.82	86.12	58.91	207.49	21.32	96.15
	19:00-21:00	103.86	91.55	24.56	19.13	84.94	124.89
	21:00-23:00	89.18	13.70	17.12	40.14	38.11	27.28
	23:00-01:00	57.39	17.04	30.37	12.17	75.92	38.16
	01:00-03:00	32.01	17.44	115.79	87.46	126.22	48.15
	03:00-05:00	30.64	39.90	47.96	37.67	6.53	68.30
	05:00-07:00	20.97	40.37	14.02	76.70	50.15	9.97
	07:00-09:00	34.29	222.48	57.03	106.81	91.93	177.48
	09:00-11:00	195.82	112.96	204.29	26.84	114.20	49.59
	11:00-13:00	103.28	157.67	147.90	355.51	131.83	57.56
	13:00-15:00	54.17	36.96	101.28	24.62	96.04	138.02

Note: Yellow background indicates the maximum and minimum movement distance of cattle in different time.

Table S6. Cumulative daily germination number of seeds after cold stratification.

	Time/d	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
CK	CK1	0	0	0	3	4	7	9	12	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14
	CK2	0	0	0	2	2	7	9	10	11	11	12	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13
	CK3	0	0	1	2	5	7	12	13	14	14	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15
Cattle	C1	0	0	4	8	9	12	13	13	13	14	16	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17
	C2	0	0	3	6	8	11	11	11	12	14	14	14	14	14	14	15	15	17	17	19	19	19	19	19	19	19	19	19	19	19	19
	C3	0	0	1	6	9	10	10	10	10	12	13	16	16	16	17	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18

Note: Yellow background indicates the time of seed germination start and end.

Table S7. Emergence rate and survival rate of *Malus sieversii* seedlings in different treatments.

Treatment	Habitat	Type	Emergence (%)	Survival (%)
C	Forest understory	1	26.67	50.00
		2	20.00	66.67
		3	26.67	50.00
		mean	24.44	55.56
		SE	2.22	5.56
W	Forest edges	1	36.67	100.00
		2	40.00	100.00
		3	33.33	100.00
		mean	36.67	100.00
		SE	1.92	0.00
	Forest gaps	1	56.67	100.00
		2	53.33	100.00
		3	50.00	100.00
		mean	53.33	100.00
		SE	1.92	0.00
	Forest understory	1	30.00	33.33
		2	26.67	37.50
		3	26.67	62.50
		mean	27.78	44.44
		SE	1.11	9.11