Appendices from published papers:

The following are appendices referenced in the listed papers published in the indicated journals. These are the supporting detailed analyses for the statistical results presented in the papers. The appendices are numbered consecutively.

Journal of Mammalogy; 2005; Vol. 86

Habitat-specific demography of sympatric vole populations over 25 years

Lowell L. Getz, Madan K. Oli, Joyce E. Hofmann, and Betty McGuire

Appendix JM 01. Proportion monthly survival (Log least square mean ± SE) for *M. ochrogaster* and *M. pennsylvanicus* in 3 habitats. LS means were computed for 2-way interaction effect (Species * Habitat) in Table 1. See Appendix JM 02 for significances

Species	Habitat	Tot_surv LSMEAN	StandardError	Pr > |t|	LSMEAN Number
MO	Alf	0.78102647	0.02403798	<.0001	1
MO	BG	0.69609013	0.02514369	<.0001	2
MO	TG	0.65255407	0.03324317	<.0001	3
MP	Alf	0.71600832	0.03397303	<.0001	4
MP	BG	0.79538436	0.02739870	<.0001	5
MP	TG	0.91515702	0.02431240	<.0001	6

Appendix JM 02. Observed significance level (*P* values) for test of null hypothesis that least square (LS) mean survival (*i*) = LS mean survival (*j*). LS means were computed for 2-way interaction effect (Species * Habitat) in Table 1. See Appendix JM 01 for definition of LS mean numbers.

Dependent Variable: T_Tot_surv

i/j	1	2	3	4	5	6
1		0.0156	0.0021	0.1242	0.6975	<.0001
2	0.0156		0.2945	0.6362	0.0075	<.0001
3	0.0021	0.2945		0.1789	0.0009	<.0001
4	0.1242	0.6362	0.1789		0.0674	<.0001
5	0.6975	0.0075	0.0009	0.0674		0.0011
6	<.0001	<.0001	<.0001	<.0001	0.0011	

Appendix JM 03. . Proportion of reproductive female (± SE) and least square mean (± SE) *M. ochrogaster* and *M. pennsylvanicus* in 3 habitats for each season. LS means were computed for 3-way interaction effect (Species * Habitat * Season) in Table 2. See Appendix JM 04 for significances.

Species	Habitat	Season	Log repro LSMEAN	Standard Error	Pr > [t]	LSMEAN Number
MO	Alf	Autumn	1.26416536	0.05697368	<.0001	1
MO	Alf	Spring	1.23642649	0.05845009	<.0001	2
MO	Alf	Summer	1.37274759	0.05869196	<.0001	3
MO	Alf	Winter	0.69570180	0.06024016	<.0001	4
MO	BG	Autumn	1.30741068	0.06001690	<.0001	5
MO	BG	Spring	1.01870503	0.06808785	<.0001	6
MO	BG	Summer	1.25861491	0.06797532	<.0001	7
MO	BG	Winter	0.79303497	0.06358513	<.0001	8
MO	TG	Autumn	1.18735535	0.07660879	<.0001	9
MO	TG	Spring	1.02739881	0.08430285	<.0001	10
MO	TG	Summer	1.31974300	0.08744201	<.0001	11
MO	TG	Winter	0.84752139	0.07768753	<.0001	12
MP	Alf	Autumn	1.24790740	0.07762196	<.0001	13
MP	Alf	Spring	1.09813233	0.09736717	<.0001	14
MP	Alf	Summer	1.17589890	0.09716172	<.0001	15
MP	Alf	Winter	0.77159403	0.10508893	<.0001	16
MP	BG	Autumn	1.17782663	0.06573608	<.0001	17
MP	BG	Spring	1.00545136	0.07231373	<.0001	18
MP	BG	Summer	1.05730012	0.07319438	<.0001	19
MP	BG	Winter	0.38032816	0.06971427	<.0001	20
MP	TG	Autumn	1.04127439	0.05564966	<.0001	21
MP	TG	Spring	0.97398373	0.05897353	<.0001	22
MP	TG	Summer	0.66292769	0.06424637	<.0001	23
MP	TG	Winter	0.31359669	0.05746353	<.0001	24

Appendix JM 04. Observed significance level (*P* values) for the test of null hypothesis that least square (LS) mean reproduction (*i*) = LS mean reproduction (*j*). LS means were computed for 3-way interaction effect (Species * Habitat * Season) in Table 2. See Appendix 2a for definition of LS mean numbers.

LS mean (*i*/*j*)	1	2	3	4	5	6	7	8	9	10	11	12
2	0.7346											
3	0.1791	0.1004										
4	<.0001	<.0001	<.0001									
5	0.6012	0.3970	0.4365	<.0001								
6	0.0063	0.0154	<.0001	0.0005	0.0015							
7	0.9505	0.8045	0.2052	<.0001	0.5906	0.0126						
8	<.0001	<.0001	<.0001	0.2668	<.0001	0.0156	<.0001					
9	0.4264	0.6105	0.0559	<.0001	0.2177	0.0991	0.4857	<.0001				
10	0.0212	0.0418	0.0008	0.0015	0.0069	0.9359	0.0327	0.0267	0.1594			
11	0.5972	0.4283	0.6157	<.0001	0.9075	0.0066	0.5805	<.0001	0.2539	0.0161		
12	<.0001	<.0001	<.0001	0.1260	<.0001	0.0969	<.0001	0.5874	0.0018	0.1161	<.0001	
13	0.8670	0.9059	0.2010	<.0001	0.5444	0.0263	0.9172	<.0001	0.5779	0.0541	0.5384	0.0003
14	0.1447	0.2234	0.0162	0.0005	0.0676	0.5029	0.1761	0.0088	0.4703	0.5821	0.0900	0.0440
15	0.4349	0.5935	0.0835	<.0001	0.2498	0.1851	0.4853	0.0010	0.9262	0.2482	0.2710	0.0084
16	<.0001	0.0001	<.0001	0.5336	<.0001	0.0482	0.0001	0.8615	0.0014	0.0574	<.0001	0.5606
17	0.3250	0.5053	0.0276	<.0001	0.1458	0.0923	0.3924	<.0001	0.9246	0.1589	0.1941	0.0012
18	0.0054	0.0131	<.0001	0.0011	0.0014	0.8936	0.0108	0.0276	0.0838	0.8431	0.0056	0.1363
19	0.0264	0.0561	0.0008	0.0002	0.0084	0.6992	0.0440	0.0065	0.2195	0.7887	0.0215	0.0494
20	<.0001	<.0001	<.0001	0.0007	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001
21	0.0054	0.0158	<.0001	<.0001	0.0012	0.7973	0.0135	0.0034	0.1229	0.8907	0.0073	0.0427
22	0.0004	0.0016	<.0001	0.0010	<.0001	0.6200	0.0016	0.0372	0.0277	0.6040	0.0011	0.1955
23	<.0001	<.0001	<.0001	0.7102	<.0001	0.0002	<.0001	0.1504	<.0001	0.0006	<.0001	0.0673
24	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001

i/j	13	14	15	16	17	18	19	20	21	22	23
14	0.2284										
15	0.5624	0.5716									
16	0.0003	0.0226	0.0048								
17	0.4902	0.4969	0.9869	0.0011							
18	0.0223	0.4441	0.1594	0.0667	0.0776						
19	0.0741	0.7373	0.3297	0.0258	0.2205	0.6142					
20	<.0001	<.0001	<.0001	0.0019	<.0001	<.0001	<.0001				
21	0.0306	0.612	0.2294	0.0235	0.113	0.6945	0.8616	<.0001			
22	0.0051	0.2761	0.076	0.0936	0.0213	0.7362	0.3758	<.0001	0.4069		
23	<.0001	0.0002	<.0001	0.3778	<.0001	0.0004	<.0001	0.0029	<.0001	0.0004	
24	<.0001	<.0001	<.0001	0.0001	<.0001	<.0001	<.0001	0.4604	<.0001	<.0001	<.0001

Appendix JM 05. Persistence (Log least square mean ± SE)) of *Microtus ochrogaster* and *M. pennsylvanicus*. LS were computed for 3-way interaction effect (Species * Habitat*Season). See Appendix JM significances.

Species	Habitat	Season	Log_persistence LSMEAN	Standard Error	Pr > |t|	LSMEAN Number
MO	Alf	Autumn	0.48566622	0.01916201	<.0001	1
MO	Alf	Spring	0.38132712	0.03851657	<.0001	2
MO	Alf	Summer	0.54071926	0.02617792	<.0001	3
MO	Alf	Winter	0.35096627	0.02537485	<.0001	4
MO	BG	Autumn	0.53296955	0.02886760	<.0001	5
MO	BG	Spring	0.35773335	0.06332398	<.0001	6
MO	BG	Summer	0.44375339	0.04350328	<.0001	7
MO	BG	Winter	0.43015562	0.03295144	<.0001	8
MO	TG	Autumn	0.45118725	0.06210610	<.0001	9
MO	TG	Spring	0.31450369	0.07027841	<.0001	10
MO	TG	Summer	0.19655806	0.06708225	0.0034	11
MO	TG	Winter	0.24646939	0.07115147	0.0005	12
MP	Alf	Autumn	0.15746432	0.07552656	0.0371	13
MP	Alf	Spring	0.44351751	0.10190525	<.0001	14
MP	Alf	Summer	0.40045218	0.10462320	0.0001	15
MP	Alf	Winter	0.31691091	0.07448476	<.0001	16
MP	BG	Autumn	0.33382358	0.04797031	<.0001	17
MP	BG	Spring	0.48814580	0.05785437	<.0001	18
MP	BG	Summer	0.59039873	0.05231160	<.0001	19
MP	BG	Winter	0.55121519	0.04604815	<.0001	20
MP	TG	Autumn	0.57602227	0.04534149	<.0001	21
MP	TG	Spring	0.50642225	0.05539134	<.0001	22
MP	TG	Summer	0.85881368	0.06985377	<.0001	23
MP	TG	Winter	0.58787894	0.03477014	<.0001	24

Appendix JM 06. Observed significance level (*P* values) for test of null hypothesis that least square (LS) mean persistence (*i*) = LS mean persistence (*j*). LS means were computed for 3-way interaction effect (Species * Habitat * Season) in Table 3. See Appendix JM 05 for definition of LS mean numbers.

Dependent Variable: log_persistence

i/j	1	2	3	4	5	6	7	8
1		0.0153	0.0898	<.0001	0.1722	0.0532	0.3780	0.1454
2	0.0153		0.0006	0.5104	0.0016	0.7502	0.2827	0.3354
3	0.0898	0.0006		<.0001	0.8424	0.0076	0.0562	0.0086
4	<.0001	0.5104	<.0001		<.0001	0.9210	0.0655	0.0570
5	0.1722	0.0016	0.8424	<.0001		0.0118	0.0875	0.0190
6	0.0532	0.7502	0.0076	0.9210	0.0118		0.2629	0.3104
7	0.3780	0.2827	0.0562	0.0655	0.0875	0.2629		0.8032
8	0.1454	0.3354	0.0086	0.0570	0.0190	0.3104	0.8032	
9	0.5958	0.3391	0.1841	0.1353	0.2325	0.2921	0.9219	0.7648
10	0.0188	0.4044	0.0026	0.6256	0.0040	0.6477	0.1179	0.1363
11	<.0001	0.0169	<.0001	0.0314	<.0001	0.0807	0.0020	0.0018
12	0.0012	0.0956	0.0001	0.1666	0.0002	0.2428	0.0180	0.0192
13	<.0001	0.0083	<.0001	0.0152	<.0001	0.0422	0.0010	0.0009
14	0.6844	0.5681	0.3556	0.3782	0.3984	0.4746	0.9983	0.9007
15	0.4231	0.8638	0.1935	0.6458	0.2221	0.7269	0.7024	0.7866
16	0.0283	0.4424	0.0046	0.6652	0.0069	0.6763	0.1415	0.1645
17	0.0033	0.4400	0.0002	0.7521	0.0004	0.7634	0.0897	0.0979
18	0.9675	0.1244	0.4078	0.0299	0.4882	0.1285	0.5397	0.3838
19	0.0602	0.0013	0.3958	<.0001	0.3365	0.0046	0.0312	0.0096
20	0.1888	0.0047	0.8429	0.0001	0.7371	0.0135	0.0899	0.0326
21	0.0665	0.0011	0.5002	<.0001	0.4232	0.0051	0.0353	0.0093
22	0.7233	0.0638	0.5756	0.0108	0.6708	0.0772	0.3736	0.2367
23	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001
24	0.0101	<.0001	0.2786	<.0001	0.2244	0.0015	0.0097	0.0010

i/j	9	10	11	12	13	14	15	16
1	0.5958	0.0188	<.0001	0.0012	<.0001	0.6844	0.4231	0.0283
2	0.3391	0.4044	0.0169	0.0956	0.0083	0.5681	0.8638	0.4424
3	0.1841	0.0026	<.0001	0.0001	<.0001	0.3556	0.1935	0.0046
4	0.1353	0.6256	0.0314	0.1666	0.0152	0.3782	0.6458	0.6652
5	0.2325	0.0040	<.0001	0.0002	<.0001	0.3984	0.2221	0.0069
6	0.2921	0.6477	0.0807	0.2428	0.0422	0.4746	0.7269	0.6763
7	0.9219	0.1179	0.0020	0.0180	0.0010	0.9983	0.7024	0.1415
8	0.7648	0.1363	0.0018	0.0192	0.0009	0.9007	0.7866	0.1645
9		0.1451	0.0054	0.0302	0.0027	0.9488	0.6767	0.1662
10	0.1451		0.2248	0.4963	0.1280	0.2974	0.4953	0.9812
11	0.0054	0.2248		0.6098	0.6988	0.0430	0.1009	0.2299
12	0.0302	0.4963	0.6098		0.3911	0.1129	0.2236	0.4941
13	0.0027	0.1280	0.6988	0.3911		0.0242	0.0597	0.1329
14	0.9488	0.2974	0.0430	0.1129	0.0242		0.7681	0.3159
15	0.6767	0.4953	0.1009	0.2236	0.0597	0.7681		0.5154
16	0.1662	0.9812	0.2299	0.4941	0.1329	0.3159	0.5154	
17	0.1348	0.8204	0.0961	0.3087	0.0488	0.3301	0.5627	0.8486
18	0.6633	0.0565	0.0010	0.0084	0.0005	0.7033	0.4633	0.0695
19	0.0865	0.0016	<.0001	<.0001	<.0001	0.1998	0.1045	0.0027
20	0.1958	0.0049	<.0001	0.0003	<.0001	0.3355	0.1873	0.0075
21	0.1046	0.0018	<.0001	<.0001	<.0001	0.2349	0.1237	0.0030
22	0.5069	0.0320	0.0004	0.0040	0.0002	0.5876	0.3707	0.0412
23	<.0001	<.0001	<.0001	<.0001	<.0001	0.0008	0.0003	<.0001
24	0.0549	0.0005	<.0001	<.0001	<.0001	0.1801	0.0892	0.0010

i/j	17	18	19	20	21	22	23	24
1	0.0033	0.9675	0.0602	0.1888	0.0665	0.7233	<.0001	0.0101
2	0.4400	0.1244	0.0013	0.0047	0.0011	0.0638	<.0001	<.0001
3	0.0002	0.4078	0.3958	0.8429	0.5002	0.5756	<.0001	0.2786
4	0.7521	0.0299	<.0001	0.0001	<.0001	0.0108	<.0001	<.0001
5	0.0004	0.4882	0.3365	0.7371	0.4232	0.6708	<.0001	0.2244
6	0.7634	0.1285	0.0046	0.0135	0.0051	0.0772	<.0001	0.0015
7	0.0897	0.5397	0.0312	0.0899	0.0353	0.3736	<.0001	0.0097
8	0.0979	0.3838	0.0096	0.0326	0.0093	0.2367	<.0001	0.0010
9	0.1348	0.6633	0.0865	0.1958	0.1046	0.5069	<.0001	0.0549
10	0.8204	0.0565	0.0016	0.0049	0.0018	0.0320	<.0001	0.0005
11	0.0961	0.0010	<.0001	<.0001	<.0001	0.0004	<.0001	<.0001
12	0.3087	0.0084	<.0001	0.0003	<.0001	0.0040	<.0001	<.0001
13	0.0488	0.0005	<.0001	<.0001	<.0001	0.0002	<.0001	<.0001
14	0.3301	0.7033	0.1998	0.3355	0.2349	0.5876	0.0008	0.1801
15	0.5627	0.4633	0.1045	0.1873	0.1237	0.3707	0.0003	0.0892
16	0.8486	0.0695	0.0027	0.0075	0.0030	0.0412	<.0001	0.0010
17		0.0401	0.0003	0.0011	0.0002	0.0185	<.0001	<.0001
18	0.0401		0.1899	0.3937	0.2319	0.8195	<.0001	0.1396
19	0.0003	0.1899		0.5740	0.8355	0.2704	0.0021	0.9680
20	0.0011	0.3937	0.5740		0.7011	0.5341	0.0002	0.5252
21	0.0002	0.2319	0.8355	0.7011		0.3309	0.0007	0.8356
22	0.0185	0.8195	0.2704	0.5341	0.3309		<.0001	0.2130
23	<.0001	<.0001	0.0021	0.0002	0.0007	<.0001		0.0005
24	<.0001	0.1396	0.9680	0.5252	0.8356	0.2130	0.0005	

Appendix JM 07. Body mass (Log least square mean ± SE)) of adult male *Microtus ochrogaster* and *M. pennsylvanicus*. LS means were computed for 3-way interaction effect (Species * Habitat*Season). See Appendix JM 08 for significances.

Species	Habitat	Season	Log_mass LSMEAN	Standard Error	Pr > |t|	LSMEAN Number
MO	Alfalfa	Autumn	3.69195932	0.00392213	<.0001	1
MO	Alfalfa	Spring	3.68343868	0.00654903	<.0001	2
MO	Alfalfa	Summer	3.68727466	0.00555462	<.0001	3
MO	Alfalfa	Winter	3.66530395	0.00432110	<.0001	4
MO	Bluegras	Autumn	3.65876088	0.00660153	<.0001	5
MO	Bluegras	Spring	3.57361124	0.00985531	<.0001	6
MO	Bluegras	Summer	3.62269974	0.00865713	<.0001	7
MO	Bluegras	Winter	3.61973949	0.00645389	<.0001	8
MO	Tallgras	Autumn	3.65876088	0.00660153	<.0001	9
MO	Tallgras	Spring	3.57361124	0.00985531	<.0001	10
MO	Tallgras	Summer	3.62269974	0.00865713	<.0001	11
MO	Tallgras	Winter	3.61973949	0.00645389	<.0001	12
MP	Alfalfa	Autumn	3.77602745	0.01106207	<.0001	13
MP	Alfalfa	Spring	3.64858661	0.01825434	<.0001	14
MP	Alfalfa	Summer	3.69267449	0.01248290	<.0001	15
MP	Alfalfa	Winter	3.70590931	0.02081315	<.0001	16
MP	Bluegras	Autumn	3.75222573	0.00985531	<.0001	17
MP	Bluegras	Spring	3.65661149	0.01051223	<.0001	18
MP	Bluegras	Summer	3.67198103	0.00983329	<.0001	19
MP	Bluegras	Winter	3.60730886	0.01266648	<.0001	20
MP	Tallgras	Autumn	3.72198475	0.00909227	<.0001	21
MP	Tallgras	Spring	3.66353214	0.00742381	<.0001	22
MP	Tallgras	Summer	3.72320348	0.00996769	<.0001	23
MP	Tallgras	Winter	3.59426825	0.00934538	<.0001	24

Appendix JM 08. Observed significance level (*P* values) for test of null hypothesis that least square (LS) mean body mass (*i*) = LS mean body mass (*j*). LS means were computed for 3-way interaction effect (Species * Habitat * Season) in Table 4. See Appendix JM 07 for definition of LS mean numbers.

Dependent Variable: log_mass

i/j	1	2	3	4	5	6	7	8
1		0.2644	0.4909	<.0001	<.0001	<.0001	<.0001	<.0001
2	0.2644		0.6551	0.0208	0.0080	<.0001	<.0001	<.0001
3	0.4909	0.6551		0.0018	0.0010	<.0001	<.0001	<.0001
4	<.0001	0.0208	0.0018		0.4070	<.0001	<.0001	<.0001
5	<.0001	0.0080	0.0010	0.4070		<.0001	0.0009	<.0001
6	<.0001	<.0001	<.0001	<.0001	<.0001		0.0002	<.0001
7	<.0001	<.0001	<.0001	<.0001	0.0009	0.0002		0.7840
8	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	0.7840	
9	<.0001	0.0080	0.0010	0.4070	1.0000	<.0001	0.0009	<.0001
10	<.0001	<.0001	<.0001	<.0001	<.0001	1.0000	0.0002	<.0001
11	<.0001	<.0001	<.0001	<.0001	0.0009	0.0002	1.0000	0.7840
12	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	0.7840	1.0000
13	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001
14	0.0202	0.0724	0.0426	0.3729	0.6002	0.0003	0.2001	0.1363
15	0.9564	0.5124	0.6927	0.0383	0.0163	<.0001	<.0001	<.0001
16	0.5101	0.3031	0.3870	0.0561	0.0309	<.0001	0.0002	<.0001
17	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001
18	0.0016	0.0303	0.0099	0.4444	0.8625	<.0001	0.0128	0.0028
19	0.0592	0.3322	0.1757	0.5342	0.2644	<.0001	0.0002	<.0001
20	<.0001	<.0001	<.0001	<.0001	0.0003	0.0358	0.3158	0.3819
21	0.0024	0.0006	0.0011	<.0001	<.0001	<.0001	<.0001	<.0001
22	0.0007	0.0444	0.0105	0.8366	0.6310	<.0001	0.0003	<.0001
23	0.0035	0.0009	0.0016	<.0001	<.0001	<.0001	<.0001	<.0001
24	<.0001	<.0001	<.0001	<.0001	<.0001	0.1283	0.0256	0.0249

i/j	9	10	11	12	13	14	15	16
1	<.0001	<.0001	<.0001	<.0001	<.0001	0.0202	0.9564	0.5101
2	0.0080	<.0001	<.0001	<.0001	<.0001	0.0724	0.5124	0.3031
3	0.0010	<.0001	<.0001	<.0001	<.0001	0.0426	0.6927	0.3870
4	0.4070	<.0001	<.0001	<.0001	<.0001	0.3729	0.0383	0.0561
5	1.0000	<.0001	0.0009	<.0001	<.0001	0.6002	0.0163	0.0309
6	<.0001	1.0000	0.0002	<.0001	<.0001	0.0003	<.0001	<.0001
7	0.0009	0.0002	1.0000	0.7840	<.0001	0.2001	<.0001	0.0002
8	<.0001	<.0001	0.7840	1.0000	<.0001	0.1363	<.0001	<.0001
9		<.0001	0.0009	<.0001	<.0001	0.6002	0.0163	0.0309
10	<.0001		0.0002	<.0001	<.0001	0.0003	<.0001	<.0001
11	0.0009	0.0002		0.7840	<.0001	0.2001	<.0001	0.0002
12	<.0001	<.0001	0.7840		<.0001	0.1363	<.0001	<.0001
13	<.0001	<.0001	<.0001	<.0001		<.0001	<.0001	0.0029
14	0.6002	0.0003	0.2001	0.1363	<.0001		0.0462	0.0384
15	0.0163	<.0001	<.0001	<.0001	<.0001	0.0462		0.5855
16	0.0309	<.0001	0.0002	<.0001	0.0029	0.0384	0.5855	
17	<.0001	<.0001	<.0001	<.0001	0.1082	<.0001	0.0002	0.0443
18	0.8625	<.0001	0.0128	0.0028	<.0001	0.7032	0.0271	0.0345
19	0.2644	<.0001	0.0002	<.0001	<.0001	0.2592	0.1929	0.1405
20	0.0003	0.0358	0.3158	0.3819	<.0001	0.0632	<.0001	<.0001
21	<.0001	<.0001	<.0001	<.0001	0.0002	0.0003	0.0577	0.4791
22	0.6310	<.0001	0.0003	<.0001	<.0001	0.4482	0.0448	0.0552
23	<.0001	<.0001	<.0001	<.0001	0.0004	0.0003	0.0560	0.4536
24	<.0001	0.1283	0.0256	0.0249	<.0001	0.0081	<.0001	<.0001

i/j	17	18	19	20	21	22	23	24
1	<.0001	0.0016	0.0592	<.0001	0.0024	0.0007	0.0035	<.0001
2	<.0001	0.0303	0.3322	<.0001	0.0006	0.0444	0.0009	<.0001
3	<.0001	0.0099	0.1757	<.0001	0.0011	0.0105	0.0016	<.0001
4	<.0001	0.4444	0.5342	<.0001	<.0001	0.8366	<.0001	<.0001
5	<.0001	0.8625	0.2644	0.0003	<.0001	0.6310	<.0001	<.0001
6	<.0001	<.0001	<.0001	0.0358	<.0001	<.0001	<.0001	0.1283
7	<.0001	0.0128	0.0002	0.3158	<.0001	0.0003	<.0001	0.0256
8	<.0001	0.0028	<.0001	0.3819	<.0001	<.0001	<.0001	0.0249
9	<.0001	0.8625	0.2644	0.0003	<.0001	0.6310	<.0001	<.0001
10	<.0001	<.0001	<.0001	0.0358	<.0001	<.0001	<.0001	0.1283
11	<.0001	0.0128	0.0002	0.3158	<.0001	0.0003	<.0001	0.0256
12	<.0001	0.0028	<.0001	0.3819	<.0001	<.0001	<.0001	0.0249
13	0.1082	<.0001	<.0001	<.0001	0.0002	<.0001	0.0004	<.0001
14	<.0001	0.7032	0.2592	0.0632	0.0003	0.4482	0.0003	0.0081
15	0.0002	0.0271	0.1929	<.0001	0.0577	0.0448	0.0560	<.0001
16	0.0443	0.0345	0.1405	<.0001	0.4791	0.0552	0.4536	<.0001
17		<.0001	<.0001	<.0001	0.0241	<.0001	0.0384	<.0001
18	<.0001		0.2857	0.0027	<.0001	0.5908	<.0001	<.0001
19	<.0001	0.2857		<.0001	0.0002	0.4929	0.0003	<.0001
20	<.0001	0.0027	<.0001		<.0001	0.0001	<.0001	0.4074
21	0.0241	<.0001	0.0002	<.0001		<.0001	0.9280	<.0001
22	<.0001	0.5908	0.4929	0.0001	<.0001		<.0001	<.0001
23	0.0384	<.0001	0.0003	<.0001	0.9280	<.0001		<.0001
24	<.0001	<.0001	<.0001	0.4074	<.0001	<.0001	<.0001	

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Factors influencing movement distances of two species of sympatric voles

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Appendix JM 09. Least squares mean (LSMEAN) and standard error (SE) of LSMEAN movement distances of *Microtus ochrogaster*. LSMEANS were computed for 2-way interaction effect (habitat*season) in Table 1. Each LSMEAN is assigned a LSMEAN number, which is used for multiple comparisons of LSMEAN movement distances (Appendix JM 10).

Habitat	Season	LSMEAN	SE	LSMEAN number
Alfalfa	Autumn	10.78	0.42	1
	Spring	8.42	0.64	2
	Summer	10.20	0.50	3
	Winter	7.03	0.46	4
Bluegrass	Autumn	13.67	0.71	5
	Spring	13.47	2.89	6
	Summer	14.47	1.58	7
	Winter	10.57	0.75	8
Tallgrass	Autumn	4.64	4.47	9
	Spring	0.07	4.97	10
	Summer	19.64	4.17	11
	Winter	11.45	3.25	12

Appendix JM 10. Observed significance levels (*P* values) for multiple comparisons of least squares mean movement distances (LSMEAN) of *Microtus ochrogaster*, with Bonferroni adjustments. *P* values are given for the test of the null hypothesis that LSMEAN(*i*) = LSMEAN(*j*). See Appendix JM 09 for definition of LSMEAN numbers.

	LSMEAN number										
i/j	1	2	3	4	5	6	7	8	9	10	11
2	0.07										
3	1.00	1.00									
4	<0.01	1.00	<0.01								
5	0.01	<0.01	<0.01	<0.01							
6	1.00	1.00	1.00	1.00	1.00						
7	1.00	0.02	0.55	<0.01	1.00	1.00					
8	1.00	1.00	1.00	<0.01	0.17	1.00	1.00				
9	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
10	1.00	1.00	1.00	1.00	0.44	1.00	0.37	1.00	1.00		
11	1.00	0.51	1.00	0.18	1.00	1.00	1.00	1.00	0.93	0.17	
12	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Appendix JM 11. Least squares mean (LSMEAN) and standard error (SE) of LSMEAN movement distances of *Microtus ochrogaster*. LSMEANS were computed for 2-way interaction effect (season*sex) in Table 1. Each LSMEAN is assigned a LSMEAN number, which is used for multiple comparisons of LSMEAN movement distances (Appendix JM 12).

Season	Sex	LSMEAN	SE	LSMEAN Number
Autumn	Male	12.98	1.56	1
	Female	6.42	1.54	2
Spring	Male	9.42	2.00	3
	Female	5.22	2.02	4
Summer	Male	18.08	1.57	5
	Female	11.46	1.55	6
Winter	Male	9.85	1.15	7
	Female	9.52	1.20	8

Appendix JM 12. Observed significance levels (*P* values) for multiple comparisons of least squares mean movement distances (LSMEAN) of *Microtus ochrogaster*, with Bonferroni adjustments. *P* values are given for the test of null hypothesis that LSMEAN(*i*) = LSMEAN(*j*). See Appendix JM 11 for definition of LSMEAN numbers.

	LSMEAN number						
i/j	1	2	3	4	5	6	7
2	<0.01						
3	1.00	1.00					
4	0.06	1.00	0.01				
5	0.54	<0.01	0.02	<0.01			
6	1.00	0.57	1.00	0.39	<0.01		
7	1.00	1.00	1.00	1.00	<0.01	1.00	
8	1.00	1.00	1.00	1.00	<0.01	1.00	1.00

Appendix JM 13. Least squares mean (LSMEAN) and standard error (SE) of LSMEAN movement distances of *Microtus pennsylvanicus*. LSMEANS were computed for 2-way interaction effect (habitat*season) in Table 4. Each LSMEAN is assigned a LSMEAN number, which is used for multiple comparisons of LSMEAN movement distances (Appendix JM 14).

Habitat	Season	LSMEAN	SE	LSMEAN number
Alfalfa	Autumn	16.96	1.27	1
	Spring	20.20	1.61	2
	Summer	15.90	1.47	3
	Winter	8.87	2.00	4
Bluegrass	Autumn	15.89	0.88	5
	Spring	14.45	1.06	6
	Summer	14.78	1.17	7
	Winter	11.78	1.42	8
Tallgrass	Autumn	20.04	0.98	9
	Spring	16.38	0.79	10
	Summer	17.43	1.16	11
	Winter	15.00	1.17	12

Appendix JM 14. Observed significance levels (*P* values) for multiple comparisons of least squares mean movement distances (LSMEAN) of *Microtus pennsylvanicus*, with Bonferroni adjustments. *P* values are given for the test of the null hypothesis that LSMEAN(*i*) = LSMEAN(*j*). See Appendix JM 21 for definition of LSMEAN numbers.

	LSMEAN number										
i/j	1	2	3	4	5	6	7	8	9	10	11
2	1.00										
3	1.00	1.00									
4	0.05	<0.01	0.32								
5	1.00	1.00	1.00	0.10							
6	1.00	0.15	1.00	0.94	1.00						
7	1.00	0.36	1.00	0.74	1.00	1.00					
8	0.45	0.01	1.00	1.00	1.00	1.00	1.00				
9	1.00	<0.01	1.00	<0.01	0.07	<0.01	0.03	0.00			
10	1.00	1.00	1.00	0.03	1.00	1.00	1.00	0.33	0.16		
11	1.00	1.00	1.00	0.02	1.00	1.00	1.00	0.14	1.00	1.00	
12	1.00	0.66	1.00	0.53	1.00	1.00	1.00	1.00	0.09	1.00	1.00

Appendix JM 15. Least squares mean (LSMEAN) and standard error (SE) of LSMEAN movement distances of *Microtus pennsylvanicus*. LSMEANS were computed for 2-way interaction effect (habitat*sex) in Table 4. Each LSMEAN is assigned a LSMEAN number, which is used for multiple comparisons of LSMEAN movement distances (Appendix JM 16).

Habitat	Sex	LSMEAN	SE	LSMEAN number
Alfalfa	Male	19.03	1.21	1
	Female	11.93	1.01	2
Bluegrass	Male	16.99	0.81	3
	Female	11.46	0.74	4
Tallgrass	Male	20.89	0.69	5
	Female	13.54	0.75	6

Appendix JM 16. Observed significance levels (*P* values) for multiple comparisons of least squares mean movement distances (LSMEAN) of *Microtus pennsylvanicus*, with Bonferroni adjustments. *P* values are given for the test of the null hypothesis that LSMEAN(*i*) = LSMEAN(*j*). See Appendix JM 17 for definition of LSMEAN numbers.

	LSMEAN number				
i/j	1	2	3	4	5
2	<0.01				
3	1.00	<0.01			
4	<0.01	1.00	<0.01		
5	1.00	<0.01	0.00	<0.01	
6	<0.01	1.00	0.02	0.65	<0.01

Appendix JM 17. Least squares mean (LSMEAN) and standard error (SE) of LSMEAN movement distances of *Microtus pennsylvanicus*. LSMEANS were computed for 2-way interaction effect (season*sex) in Table 4. Each LSMEAN is assigned a LSMEAN number, which is used for multiple comparisons of LSMEAN movement distances (Appendix JM 18).

Season	Sex	LSMEAN	SE	LSMEAN number
Autumn	Male	22.90	0.94	1
	Female	12.36	0.77	2
Spring	Male	20.11	0.93	3
	Female	13.91	0.92	4
Summer	Male	19.91	1.06	5
	Female	12.17	1.04	6
Winter	Male	12.98	1.26	7
	Female	10.80	1.14	8

Appendix JM 18. Observed significance levels (*P* values) for multiple comparisons of least squares mean movement distances (LSMEAN) of *Microtus pennsylvanicus*, with Bonferroni adjustments. *P* values are given for the test of the null hypothesis that LSMEAN(*i*) = LSMEAN(*j*). See Appendix JM 19 for definition of LSMEAN numbers.

	LSMEAN number						
i/j	1	2	3	4	5	6	7
2	<0.01						
3	0.61	<0.01					
4	<0.01	1.00	<0.01				
5	0.54	<0.01	1.00	<0.01			
6	<0.01	1.00	<0.01	1.00	<0.01		
7	<0.01	1.00	0.00	1.00	0.00	1.00	
8	<0.01	1.00	<0.01	0.95	<0.01	1.00	1.00

Appendix JM 19. Least squares mean (LSMEAN) and standard error (SE) of LSMEAN movement distances of *Microtus pennsylvanicus* in control and supplementally fed bluegrass and tallgrass habitats. LSMEANS were computed for 2-way interaction effect (habitat*season) in Table 7. Each LSMEAN is assigned a LSMEAN number, which is used for multiple comparisons of LSMEAN movement distances (Appendix JM 20).

Habitat	Treatment	LSMEAN	SE	LSMEAN number
Bluegrass	Control	10.43	0.65	1
	Supplementally fed	12.25	0.96	2
Tallgrass	Control	14.46	0.58	3
	Supplementally fed	11.77	0.54	4

Appendix JM 20. Observed significance levels (*P* values) for multiple comparisons of least squares mean movement distances (LSMEAN) of *Microtus pennsylvanicus* in control and supplementally fed bluegrass and tallgrass habitats, with Bonferroni adjustments. *P* values are given for the test of the null hypothesis that LSMEAN(*i*) = LSMEAN(*j*). See Appendix JM 19 for definition of LSMEAN numbers.

	LSMEAN number		
i/j	1	2	3
2	0.41		
3	<0.01	0.27	
4	0.68	1.00	<0.01

Appendix JM 21. Least squares mean (LSMEAN) and standard error (SE) of LSMEAN movement distances of *Microtus pennsylvanicus* in control and supplementally fed bluegrass and tallgrass habitats. LSMEANS were computed for 2-way interaction effect (habitat*reproductive condition) in Table 7. Each LSMEAN is assigned a LSMEAN number, which is used for multiple comparisons of LSMEAN movement distances (Appendix JM 22).

Site	Cond1	LSMEAN	SE	LSMEAN number
Bluegrass	Non-reproductive	9.41	1.14	1
	Reproductive	13.27	0.56	2
Tallgrass	Non-reproductive	13.53	0.79	3
	Reproductive	12.70	0.45	4

Appendix JM 22. Observed significance levels (*P* values) for multiple comparisons of least squares mean movement distances (LSMEAN) of *Microtus pennsylvanicus* in control and supplementally fed bluegrass and tallgrass habitats, with Bonferroni adjustments. *P* values are given for the test of the null hypothesis that LSMEAN(*i*) = LSMEAN(*j*). See Appendix JM 21 for definition of LSMEAN numbers.

	LSMEAN number		
i/j	1	2	3
2	0.01		
3	0.01	1.00	
4	0.05	1.00	1.00

Appendix JM 23. Least squares mean (LSMEAN) and standard error (SE) of LSMEAN movement distances of *Microtus pennsylvanicus* in control and supplementally fed bluegrass and tallgrass habitats. LSMEANS were computed for 2-way interaction effect (sex*reproductive condition) in Table 7. Each LSMEAN is assigned a LSMEAN number, which is used for multiple comparisons of LSMEAN movement distances (Appendix JM 24).

Sex	Reproductive condition	LSMEAN	SE	LSMEAN number
Male	Non-reproductive	11.63	1.10	1
	Reproductive	15.64	0.48	2
Female	Non-reproductive	11.31	0.80	3
	Reproductive	10.33	0.51	4

Appendix JM 24. Observed significance levels (*P* values) for multiple comparisons of least squares mean movement distances (LSMEAN) of *Microtus pennsylvanicus* in control and supplementally fed bluegrass and tallgrass habitats, with Bonferroni adjustments. *P* values are given for the test of the null hypothesis that LSMEAN(*i*) = LSMEAN(*j*). See Appendix JM 23 for definition of LSMEAN numbers.

	LSMEAN number		
i/j	1	2	3
2	0.01		
3	1.00	<0.01	
4	1.00	<0.01	1.00