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(Article begins on next page)

Habitat-level environmental complexity increases co-occurrences between natural and introduced predators in sweet peppers under protected environments with a positive effect on pest regulation

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Study system

Annual community's habitat comprised *Tuberarietea guttatae* Br.-Bl. 1952 em. Rivas-Martínez 1978, *Trachynietalia distachyae* Rivas-Martínez 1978, *Trachynion distachyae* (calciphile), *Sedo-Ctenopsion* (gypsophile), and *Omphalodion commutatae* (dolomitic and silico-basiphile), with species in these alliances including *Dactylis hispanica*, *Asphodelus ramosus*, *Anthyllis vulneraria*, *Carlina corymbosa*, *Sedum sediforme*, *Reichardia picroides*, *Phlomis lychnitis*, and *Venula bromoides*.

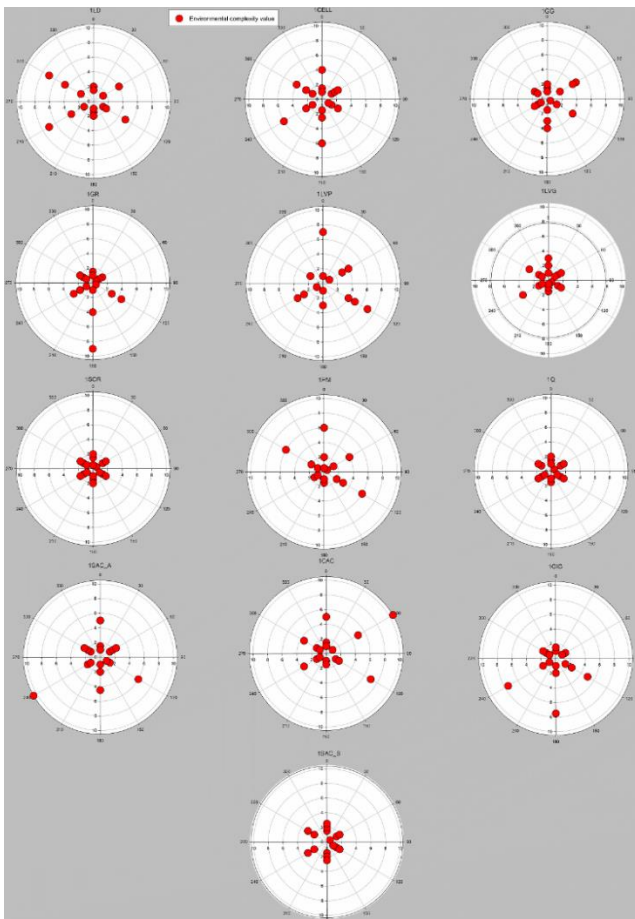


Figure S1. Example for 2020 to calculate the environmental complexity values (ECVs) in the various coordinates analyzed for each site. The ECV values ranged from a minimum of 0.5 to a maximum of 10.5.

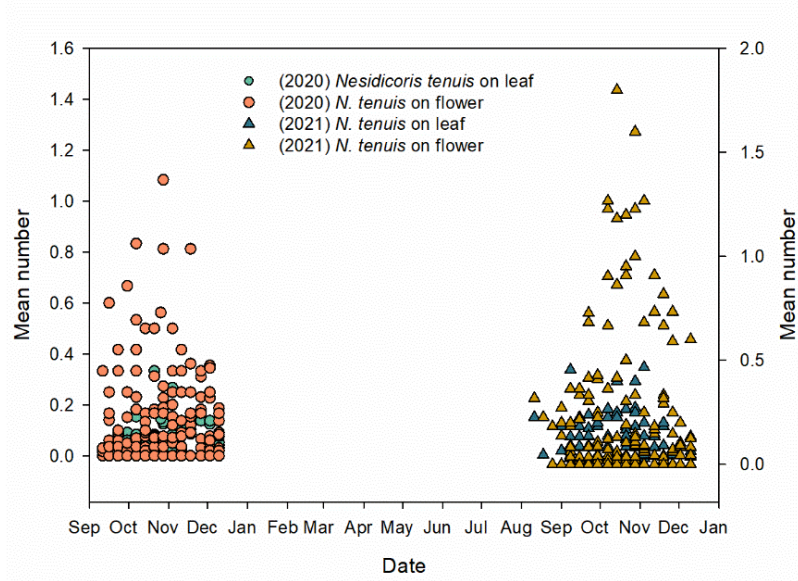


Figure S2. Weekly mean of *Nesidiocoris tenuis* on leaf and flower (2020 left, 2021 right). The figures represent juveniles and adults in leaf or flower.

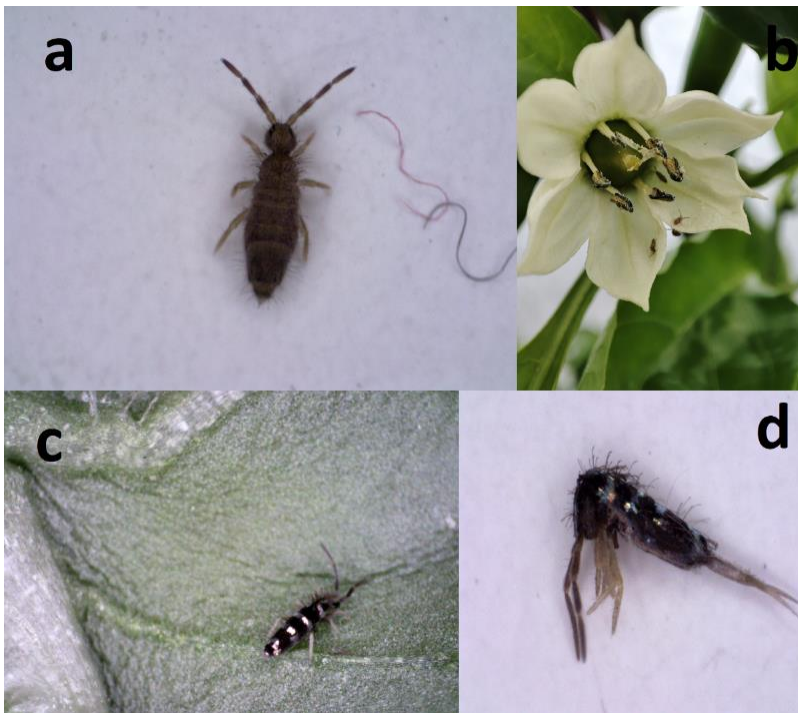


Figure S3. a) *Entomobrya* sp (Fam. Entomobryidae: Entomobryinae); b) Springtails *Entomobrya* sp. on pepper flower; c) *Seira* sp. (Fam. Entomobryidae: Seirinae); d) Lateral view of *Seira* sp.

Table S1. Means, standard deviation at different sites. *Orius laevigatus*, *Nesidiocoris tenuis*, *Amblyseius swirskii* and WFT at different sites are the total of juveniles and adults for each flower

Site	Species	2020			2021		
		Mean (2020)	Std. Error	N	Mean (2021)	Std. Error	N
1CAC	<i>Amblyseius swirskii</i>	0.45	0.071	576	0,08	0.023	672
	WFT	0.70	0.29	576	0.39	0.036	672
	<i>Orius laevigatus</i>	0.29	0.024	576	0.55	0.029	670
	<i>Nesidiocoris tenuis</i>	0.38	0.030	576	0.09,	0.013	672
1CEL	<i>Amblyseius swirskii</i>	0.30	0.067	429			
	WFT	0.55	0.071	429			
	<i>Orius laevigatus</i>	0.61	0.038	428			
	<i>Nesidiocoris tenuis</i>	0.06	0.013	429			
1GG	<i>Amblyseius swirskii</i>	0.58	0.11	263	0.30	0.07	330
	WFT	0.95	0.082	264	1.03	0.086	330
	<i>Orius laevigatus</i>	0.40	0.038	264	0.30	0.027	329
	<i>Nesidiocoris tenuis</i>	0.07	0.017	263	0.61	0.051	329
1GIG	<i>Amblyseius swirskii</i>	0.53	0.123	195	1.64	0.279	135
	WFT	0.25	0.052	195	0.25	0.056	135
	<i>Orius laevigatus</i>	0.98	0.073	195	0.42	0.056	135
	<i>Nesidiocoris tenuis</i>	0.21	0.044	195	0.0	0.0	135
1GR	<i>Amblyseius swirskii</i>	0.79	0.171	169			
	WFT	0.72	0.092	169			

	<i>Orius laevigatus</i>	0.47	0.052	169			
	<i>Nesidiocoris tenuis</i>	0.10	0.025	169			
1LD	<i>Amblyseius swirskii</i>	2.96	0.20	754			
	WFT	0.87	0.054	754			
	<i>Orius laevigatus</i>	0.19	0.017	754			
	<i>Nesidiocoris tenuis</i>	0.14	0.015	754			
1LVG	<i>Amblyseius swirskii</i>	0.30	0.054	462	0.12	0.06	297
	WFT	1.83	0.104	462	1.46	0.101	297
	<i>Orius laevigatus</i>	0.25	0.028	462	0.21	0.027	297
	<i>Nesidiocoris tenuis</i>	0.08	0.015	462	0.09	0.019	297
1LVP	<i>Amblyseius swirskii</i>	0.16	0.053	168	0.09	0.031	180
	WFT	1.99	0.198	168	1.38	0.133	180
	<i>Orius laevigatus</i>	0.22	0.035	168	0.37	0.045	180
	<i>Nesidiocoris tenuis</i>	0.38	0.047	168	0.28	0.041	180
1PM	<i>Amblyseius swirskii</i>	1.35	0.106	650	0.29	0.052	700
	WFT	1.53	0.071	650	0.54	0.0425	700
	<i>Orius laevigatus</i>	0.11	0.012	650	0.29	0.052	700
	<i>Nesidiocoris tenuis</i>	0.02	0.028	650	0.54	0.0425	700
1Q	<i>Amblyseius swirskii</i>	0.61	0.096	364	0.57	0.094	392
	WFT	2.72	0.158	364	1.60	0.111	392
	<i>Orius laevigatus</i>	0.20	0.029	364	0.32	0.027	392

	<i>Nesidiocoris tenuis</i>	0.01	0.05	364	0.01	0.0044	392
1SAC_A	<i>Amblyseius swirskii</i>	0.07	0.046	156	0.12	0.054	156
	WFT	0.38	0.065	156	1.12	0.121	156
	<i>Orius laevigatus</i>	0.67	0.070	156	0.30	0.045	156
	<i>Nesidiocoris tenuis</i>	0.25	0.048	156	0.01	0.090	156
1SAC_S	<i>Amblyseius swirskii</i>	0.31	0.071	260	0.11	0.044	180
	WFT	1.36	0.118	260	1.64	0.134	180
	<i>Orius laevigatus</i>	0.37	0.036	260	0.12	0.025	180
	<i>Nesidiocoris tenuis</i>	0.02	0.009	260	0.00	0.00	180
1SOR	<i>Amblyseius swirskii</i>	,18	0.052	336	0.27	0.71	392
	WFT	2.12	0.156	336	0.06	0.060	392
	<i>Orius laevigatus</i>	0.13	0.020	335	0.26	0.026	392
	<i>Nesidiocoris tenuis</i>	0.02	0.009	336	0.04	0.010	392
1 COST	<i>Amblyseius swirskii</i>				0.32	0.074	322
	WFT				0.96	0.084	322
	<i>Orius laevigatus</i>				0.32	0.032	319
	<i>Nesidiocoris tenuis</i>				0.12	0.02	319
1MANB	<i>Amblyseius swirskii</i>				0.83	0.132	240
	WFT				0.31	0.046	240
	<i>Orius laevigatus</i>				0.07	0.022	240
	<i>Nesidiocoris tenuis</i>				0.70	0.064	240

1MANP	<i>Amblyseius swirskii</i>				0.34	0.077	352
	WFT				0.74	0.065	352
	<i>Orius laevigatus</i>				0.24	0.025	351
	<i>Nesidiocoris tenuis</i>				0.44	0.041	351
TOTAL	<i>Amblyseius swirskii</i>	0.93	0.041	4782	0.33	0.021	4348
	WFT	1.25	,0.028	4782	0.856	0.022	4348
	<i>Orius laevigatus</i>	0.31	0.009	4782	0.338	0.088	4348
	<i>Nesidiocoris tenuis</i>	0.12	0.006	4782	0.17	0.079	4348

Table S2. Pearson correlation matrix for monitored sites. WFT (western fly thrips), *Orius laevigatus*, *Amblyseius swirskii* and *Nesidiocoris tenuis* at different sites are the total of juveniles and adults for each flower.

2020	WFT	<i>A. swirskii</i>	<i>O. laevigatus</i>	<i>N. tenuis</i>	2021	WFT	<i>A. swirskii</i>	<i>O. laevigatus</i>	<i>N. tenuis</i>
All sites					All sites				
WFT	1				WFT	1			
<i>A. swirskii</i>	-0.074**	1			<i>A. swirskii</i>	-0.039*	1		
<i>O. laevigatus</i>	-0.185**	-0.086**	1		<i>O. laevigatus</i>	-0.251**	-0.091**	1	
<i>N. tenuis</i>	-0.107**	-0.013	-0.027	1	<i>N. tenuis</i>	-0.087**	-0.008	-0.036*	1
1CAC					1CAC				
WFT	1				WFT	1			
<i>A. swirskii</i>	-0.042	1			<i>A. swirskii</i>	-0.03	1		
<i>O. laevigatus</i>	-0.111**	-0.054	1		<i>O. laevigatus</i>	-0.23**	-0.08*	1	
<i>N. tenuis</i>	-0.123**	0.010	-0.084*	1	<i>N. tenuis</i>	-0.048	-0.03	0.062	1
1CELL					1COST				
WFT	1				WFT	1			
<i>A. swirskii</i>	-0.011	1			<i>A. swirskii</i>	-0.071	1		
<i>O. laevigatus</i>	-0.184**	-0.034	1		<i>O. laevigatus</i>	-0.25**	0.015	1	
<i>N. tenuis</i>	-0.103*	0.039	-0.02	1	<i>N. tenuis</i>	-0.101	0.038	0.006	1
1GG					1GG				
WFT	1				WFT	1			
<i>A. swirskii</i>	-0.026	1			<i>A. swirskii</i>	-0.049	1		
<i>O. laevigatus</i>	-0.153*	-0.088	1		<i>O. laevigatus</i>	-0.306**	-0.093	1	
<i>N. tenuis</i>	-0.097	-0.147*	-0.050	1	<i>N. tenuis</i>	-0.201**	0.015	-0.024	1
1GIG					1GIG				
WFT	1				WFT	1			
<i>A. swirskii</i>	-0.040	1			<i>A. swirskii</i>	-0.09	1		
<i>O. laevigatus</i>	-0.201**	-0.117	1		<i>O. laevigatus</i>	-0.162	-0.235**	1	
<i>N. tenuis</i>	0.048	-0.056	-0.159*	1	<i>N. tenuis</i>				1
1GR					1MANB				
WFT	1				WFT	1			
<i>A. swirskii</i>	-0.226**	1			<i>A. swirskii</i>	-0.169**	1		
<i>O. laevigatus</i>	-0.265**	-0.067	1		<i>O. laevigatus</i>	-0.074	-0.13	1	
<i>N. tenuis</i>	-0.096	-0.12	-0.11	1	<i>N. tenuis</i>	-0.177**	-0.149**	-0.06	1
1LD					1MANP				

WFT	1				WFT	1			
<i>A. swirskii</i>	-0.126**	1			<i>A. swirskii</i>	-0.07	1		
<i>O. laevigatus</i>	-0.117**	-0.139**	1		<i>O. laevigatus</i>	-0.218**	0.095	1	
<i>N. tenuis</i>	-0.101**	-0.026	0.031	1	<i>N. tenuis</i>	-0.043	-0.017	-0.017	1
ILVG					ILVG				
WFT	1				WFT	1			
<i>A. swirskii</i>	-0.057	1			<i>A. swirskii</i>	-0.083	1		
<i>O. laevigatus</i>	-0.147**	-0.051	1		<i>O. laevigatus</i>	-0.234**	-0.045	1	
<i>N. tenuis</i>	-0.13**	0.037	0.027	1	<i>N. tenuis</i>	-0.135*	-0.33	0.118*	1
ILVP					ILVP				
WFT	1				WFT	1			
<i>A. swirskii</i>	-0.091	1			<i>A. swirskii</i>	0.092	1		
<i>O. laevigatus</i>	-0.192*	0.077	1		<i>O. laevigatus</i>	-0.329**	-0.133	1	
<i>N. tenuis</i>	-0.197*	-0.117	-0.257**	1	<i>N. tenuis</i>	-0.152*	0.036	0.055	1
IPM					IPM				
WFT	1				WFT	1			
<i>A. swirskii</i>	-0.048	1			<i>A. swirskii</i>	0.17**	1		
<i>O. laevigatus</i>	-0.058	0.05	1		<i>O. laevigatus</i>	-0.289**	-0.144**	1	
<i>N. tenuis</i>	0.018	-0.036	-0.04	1	<i>N. tenuis</i>	-0.053	-0.003	0.053	1
IQ					IQ				
WFT	1				WFT	1			
<i>A. swirskii</i>	-0.116*	1			<i>A. swirskii</i>	-0.108**	1		
<i>O. laevigatus</i>	-0.159*	0.026	1		<i>O. laevigatus</i>	-0.32**	-0.09	1	
<i>N. tenuis</i>	-0.052	-0.030	-0.033	1	<i>N. tenuis</i>	-0.024	-0.027	-0.042	1
ISAC_A					ISAC_A				
WFT	1				WFT	1			
<i>A. swirskii</i>	-0.059	1			<i>A. swirskii</i>	-0.089	1		
<i>O. laevigatus</i>	-0.191*	-0.111	1		<i>O. laevigatus</i>	-0.269**	-0.093	1	
<i>N. tenuis</i>	0.0	-0.052	-0.014	1	<i>N. tenuis</i>	-0.009	-0.02	-0.061	1
ISAC_S					ISAC_S				
WFT	1				WFT	1			
<i>A. swirskii</i>	-0.082	1			<i>A. swirskii</i>	0.038	1		
<i>O. laevigatus</i>	-0.214**	0.057	1		<i>O. laevigatus</i>	-0.169**	0.018	1	
<i>N. tenuis</i>	-0.056	0.229**	-0.052	1	<i>N. tenuis</i>				1
ISOR					ISOR				
WFT	1				WFT	1			
<i>A. swirskii</i>	-0.086	1			<i>A. swirskii</i>	-0.063	1		
<i>O. laevigatus</i>	-0.171**	0.060	1		<i>O. laevigatus</i>	-0.197**	-0.077	1	
<i>N. tenuis</i>	-0.051	0.034	0.006	1	<i>N. tenuis</i>	-0.45	0.041	-0.013	1

*P<0.05 - **P<0.01