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Abstract

datasets; χ^2 and P-values from type3 likelihood ratio analysis were used to compare the effects.

RESULTS

Both the sub-soil and surface-dwelling macro-invertebrate samples obtained by soil sampling and pitfall trapping, respectively, were numerically dominated by detritivores. Herbivores were the second largest group found in the sub-soil, whereas predators were second largest group in the surface-dwelling macro-invertebrate community.

Bronze beetles

The density of bronze beetles (cumulative total of larvae, pupae and adults) in soil samples varied

Table 1 Sub-soil macro-invertebrates (mean number/m²) in orchards with a history of high and low bronze beetle damage.

Previous history	Predators			Bronze beetle			Other herbivores			Detritivores						
	Oct	Nov	Dec	Jan	Feb	Dec	Jan	Dec	Nov	Oct	Nov	Dec	Jan			
High bronze beetle	274.7	106.5	185.2	120.4	592.6	265.4	34.0	12.3	561.7	402.8	188.3	216.0	899.7	409.0	696.0	478.4
Low bronze beetle	142.0	66.4	29.3	37.0	66.4	24.7	4.6	1.5	242.3	189.8	104.9	57.1	935.2	429.0	521.6	273.1
χ^2 value	27.88	6.09	81.8	30.1	313.0	151.18	16.31	6.2	84.56	50.72	15.56	63.88	0.44	0.31	16.24	36.79
P-value	<.0001	.014	<.0001	<.0001	<.0001	<.0001	<.0001	.013	<.0001	<.0001	<.0001	<.0001	<.0001	.505	.577	<.0001

Table 2 Surface-dwelling macro-invertebrates (mean number/trap) caught over the preceding month in pitfall traps in orchards with a history of high and low bronze beetle damage.

Previous history	Predators			Bronze beetle			Other herbivores			Detritivores						
	Nov	Dec	Jan	Feb	Dec	Jan	Feb	Nov	Dec	Jan	Nov	Dec	Jan	Feb		
High bronze beetle	23.79	35.35	66.60	35.45	0	0.95	0.1	0	4.1	3.15	2.55	1.85	83.79	56.6	137.35	71.15
Low bronze beetle	40.75	44.85	84.68	45.55	0	0.15	0	0	4.6	3.25	2.84	1.80	114.75	97.85	221.37	125.4
χ^2 value	87.69	22.56	42.27	25.25	12.97	.0003			0.51	0.03	0.31	0.01	94.34	223.04	387.85	303.4
P-value	<.0001	<.0001	<.0001	<.0001	.0003				.46	.86	.58	.91	<.0001	<.0001	<.0001	<.0001

Table 3 Abundance of different surface-dwelling generalist predator taxa (mean total number/trap) in orchards with a history of high and low bronze beetle damage.

Previous history	Predators			Bronze beetle			Other herbivores			Detritivores						
	Nov	Dec	Jan	Feb	Dec	Jan	Feb	Nov	Dec	Jan	Nov	Dec	Jan			
High bronze beetle	23.79	35.35	66.60	35.45	0	0.95	0.1	0	4.1	3.15	2.55	1.85	83.79	56.6	137.35	71.15
Low bronze beetle	40.75	44.85	84.68	45.55	0	0.15	0	0	4.6	3.25	2.84	1.80	114.75	97.85	221.37	125.4
χ^2 value	87.69	22.56	42.27	25.25	12.97	.0003			0.51	0.03	0.31	0.01	94.34	223.04	387.85	303.4
P-value	<.0001	<.0001	<.0001	<.0001	.0003				.46	.86	.58	.91	<.0001	<.0001	<.0001	<.0001

month of January are responsible for containing the population growth of bronze beetle populations in Low BB orchards needs more research. Observation of specific predation by spiders on bronze beetles emerging from the ground is needed to add support this hypothesis. The current findings could not explain conclusively why some orchards have more spiders than others.

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