

## Supplementary material S2 – S5

**Table S2:** Effects of local vineyard and landscape parameters on Caelifera and Ensifera species richness and density, and density of the two most abundant species *Chorthippus biguttulus* and *Oedipoda caerulescens* analysed using vineyard types. The presented estimates and p-values are obtained from the single models  $Y \sim \text{Intercept} + \text{Predictor}$  with 'vineyard triplet' as random factor.  $R^2$  marginal gives explained variation without and  $R^2$  conditional with the random factor. Significant predictors ( $p < 0.05$ ) are printed in bold; SNH: semi-natural habitat.

Dependent variable	Predictor	Estimate $\pm$ SE	p-Value	$R^2_{\text{marg}}$	$R^2_{\text{cond}}$	AICc
Caelifera species richness	SNH (%)	0.01 $\pm$ 0.14	0.7890	0.01	0.01	140.0
	Vineyard (%)	-0.18 $\pm$ 0.14	0.1900	0.03	0.03	138.9
	Forest (%)	0.14 $\pm$ 0.14	0.3310	0.02	0.02	139.7
	SNH distance (m)	0.11 $\pm$ 0.14	0.4180	0.01	0.00	140.0
	Forest distance (m)	-0.19 $\pm$ 0.16	0.2350	0.03	0.00	139.1
	<b>Vegetation height (cm)</b>	<b>-1.15 <math>\pm</math> 0.32</b>	<b>0.0003</b>	<b>0.66</b>	<b>0.66</b>	<b>116.2</b>
	<b>Bare ground cover (%)</b>	<b>0.38 <math>\pm</math> 0.12</b>	<b>0.0016</b>	<b>0.14</b>	<b>0.14</b>	<b>131.5</b>
	Vegetation cover (%)	0.19 $\pm$ 0.12	0.1320	0.03	0.03	138.5
	<b>Shrub cover (%)</b>	<b>-1.21 <math>\pm</math> 0.32</b>	<b>0.0002</b>	<b>0.70</b>	<b>0.70</b>	<b>112.3</b>
	Litter cover (%)	0.06 $\pm$ 0.14	0.6766	0.01	0.01	140.4
Caelifera density	SNH (%)	0.04 $\pm$ 0.05	0.3750	0.02	0.02	33.9
	Vineyard (%)	-0.01 $\pm$ 0.05	0.9710	0.01	0.01	34.7
	Forest (%)	0.01 $\pm$ 0.05	0.9610	0.01	0.01	34.7
	SNH distance (m)	0.03 $\pm$ 0.05	0.4910	0.01	0.00	34.2
	Forest distance (m)	-0.03 $\pm$ 0.05	0.5810	0.01	0.00	34.4
	<b>Vegetation height (cm)</b>	<b>-0.14 <math>\pm</math> 0.05</b>	<b>0.0051</b>	<b>0.16</b>	<b>0.22</b>	<b>27.7</b>
	Bare ground cover (%)	0.11 $\pm$ 0.05	<b>0.0352</b>	0.11	0.11	30.5
	<b>Vegetation cover (%)</b>	<b>0.11 <math>\pm</math> 0.05</b>	<b>0.0245</b>	<b>0.10</b>	<b>0.10</b>	<b>29.9</b>
	<b>Shrub cover (%)</b>	<b>-0.14 <math>\pm</math> 0.04</b>	<b>0.0013</b>	<b>0.19</b>	<b>0.21</b>	<b>25.3</b>
	Litter cover (%)	-0.02 $\pm$ 0.05	0.7490	0.01	0.01	34.6
Ensifera species richness	SNH (%)	-0.13 $\pm$ 0.16	0.1020	0.08	0.08	117.5
	Vineyard (%)	0.31 $\pm$ 0.16	0.0543	0.11	0.11	116.5
	Forest (%)	0.01 $\pm$ 0.17	0.9590	0.01	0.08	120.1
	<b>SNH distance (m)</b>	<b>0.42 <math>\pm</math> 0.14</b>	<b>0.0040</b>	<b>0.18</b>	<b>0.24</b>	<b>113.8</b>
	Forest distance (m)	-0.09 $\pm$ 0.18	0.6260	0.01	0.05	121.8
	<b>Vegetation height (cm)</b>	<b>-0.54 <math>\pm</math> 0.26</b>	<b>0.0352</b>	<b>0.26</b>	<b>0.33</b>	<b>113.8</b>
	Bare ground cover (%)	0.22 $\pm$ 0.17	0.2100	0.05	0.20	118.5
	Vegetation cover (%)	0.17 $\pm$ 0.15	0.2530	0.04	0.05	1118.9
	<b>Shrub cover (%)</b>	<b>-0.51 <math>\pm</math> 0.23</b>	<b>0.0340</b>	<b>0.24</b>	<b>0.27</b>	<b>114.1</b>
	Litter cover (%)	0.10 $\pm$ 0.16	0.5240	0.01	0.08	119.7
Ensifera density	<b>SNH (%)</b>	<b>-0.04 <math>\pm</math> 0.02</b>	<b>0.0304</b>	<b>0.10</b>	<b>0.10</b>	<b>-45.9</b>
	<b>Vineyard (%)</b>	<b>0.05 <math>\pm</math> 0.02</b>	<b>0.0112</b>	<b>0.13</b>	<b>0.13</b>	<b>-47.5</b>
	Forest (%)	-0.02 $\pm$ 0.02	0.3970	0.02	0.02	-42.2
	<b>SNH distance (m)</b>	<b>0.06 <math>\pm</math> 0.02</b>	<b>0.0029</b>	<b>0.17</b>	<b>0.00</b>	<b>-49.5</b>
	Forest distance (m)	0.01 $\pm$ 0.02	0.5510	0.01	0.01	-41.8
	Vegetation height (cm)	-0.02 $\pm$ 0.02	0.3810	0.02	0.02	-42.2
	Bare ground cover (%)	-0.02 $\pm$ 0.02	0.4090	0.02	0.02	-42.1

<i>C. biguttulus</i> density	Vegetation cover (%)	0.01 ± 0.02	0.7080	0.01	0.01	-41.6
	Shrub cover (%)	-0.01 ± 0.02	0.8460	0.01	0.01	-41.5
	Litter cover (%)	0.02 ± 0.02	0.3730	0.02	0.02	-42.2
	SNH (%)	-0.01 ± 0.04	0.8194	0.01	0.00	18.8
	Vineyard (%)	0.05 ± 0.04	0.2624	0.03	0.00	17.7
	Forest (%)	-0.02 ± 0.04	0.6048	0.01	0.00	18.6
	SNH distance (m)	0.05 ± 0.04	0.2387	0.03	0.00	17.5
	Forest distance (m)	0.02 ± 0.04	0.7877	0.01	0.00	18.6
	<b>Vegetation height (cm)</b>	<b>-0.08 ± 0.04</b>	<b>0.0393</b>	<b>0.09</b>	<b>0.00</b>	<b>14.8</b>
	Bare ground cover (%)	0.03 ± 0.04	0.4824	0.01	0.00	18.4
	<b>Vegetation cover (%)</b>	<b>0.09 ± 0.04</b>	<b>0.0192</b>	<b>0.11</b>	<b>0.00</b>	<b>13.7</b>
	Shrub cover (%)	-0.01 ± 0.02	0.8460	0.01	0.01	41.5
	Litter cover (%)	0.01 ± 0.04	0.8140	0.01	0.00	18.8
	<b>SNH (%)</b>	<b>-0.03 ± 0.01</b>	<b>0.0220</b>	<b>0.11</b>	<b>0.00</b>	<b>-83.2</b>
	Vineyard (%)	0.02 ± 0.01	0.1189	0.05	0.00	-80.6
	Forest (%)	-0.01 ± 0.01	0.9068	0.00	0.00	-78.3
	SNH distance (m)	-0.01 ± 0.02	0.7040	0.01	0.00	-78.4
	Forest distance (m)	-0.02 ± 0.02	0.1984	0.04	0.00	-79.9
	Vegetation height (cm)	-0.02 ± 0.01	0.1590	0.04	0.00	-80.2
<i>O. caerulescens</i> density	Bare ground cover (%)	0.05 ± 0.02	<b>&lt;0.0001</b>	0.31	0.00	-94.3
	Vegetation cover (%)	0.01 ± 0.01	0.7396	0.01	0.00	-78.3
	<b>Shrub cover (%)</b>	<b>-0.03 ± 0.01</b>	<b>0.0328</b>	<b>0.09</b>	<b>0.00</b>	<b>-82.6</b>
	Litter cover (%)	-0.03 ± 0.01	0.0591	0.08	0.00	-81.7

**Table S3:** Effects of local vineyard and landscape parameters on Orthoptera, Caelifera and Ensifera species richness and density, and density of the two most abundant species *Chorthippus biguttulus* and *Oedipoda caerulescens* analysed using vineyard compartments. The presented estimates and p-values are obtained from the single models  $Y \sim \text{Intercept} + \text{Predictor}$  with ‘vineyard row’ as random factor.  $R^2$  marginal gives explained variation without and  $R^2$  conditional with the random factor. Significant predictors ( $p < 0.05$ ) are printed in bold; SNH: semi-natural habitat.

Dependent variable	Predictor	Estimate ± SE	p-Value	$R^2_{\text{marg}}$	$R^2_{\text{cond}}$	AICc
Orthoptera species richness	SNH (%)	0.11 ± 0.09	0.1830	0.02	0.07	186.5
	Vineyard (%)	-0.07 ± 0.09	0.4300	0.01	0.07	187.7
	Forest (%)	0.12 ± 0.08	0.1260	0.02	0.07	186.1
	SNH distance (m)	0.07 ± 0.08	0.3730	0.01	0.07	187.5
	Forest distance (m)	-0.14 ± 0.09	0.1160	0.04	0.07	185.7
	<b>Vegetation height (cm)</b>	<b>0.18 ± 0.06</b>	<b>0.0048</b>	<b>0.06</b>	<b>0.10</b>	<b>181.4</b>
	<b>Bare ground cover (%)</b>	<b>-0.21 ± 0.08</b>	<b>0.0158</b>	<b>0.07</b>	<b>0.19</b>	<b>182.6</b>
	Vegetation cover (%)	0.06 ± 0.08	0.4420	0.01	0.01	187.7
	Shrub cover (%)	0.07 ± 0.07	0.3290	0.01	0.09	187.4
	Litter cover (%)	0.16 ± 0.08	0.0567	0.04	0.17	184.77
	SNH (%)	0.05 ± 0.06	0.4010	0.01	0.11	88.3
	Vineyard (%)	0.04 ± 0.06	0.5370	0.01	0.11	88.6
	Forest (%)	0.06 ± 0.06	0.3620	0.02	0.11	88.2
Orthoptera density	SNH distance (m)	0.03 ± 0.07	0.6420	0.01	0.11	88.8
	Forest distance (m)	-0.04 ± 0.07	0.5780	0.01	0.11	88.7

	Vegetation height (cm)	0.11 ± 0.06	0.0710	0.05	0.17	85.8
	<b>Bare ground cover (%)</b>	<b>-0.12 ± 0.06</b>	<b>0.0477</b>	<b>0.06</b>	<b>0.23</b>	<b>85.3</b>
	<b>Vegetation cover (%)</b>	<b>0.15 ± 0.06</b>	<b>0.0161</b>	<b>0.09</b>	<b>0.16</b>	<b>83.5</b>
	Shrub cover (%)	0.02 ± 0.06	0.7040	0.01	0.13	88.9
	Litter cover (%)	0.04 ± 0.06	0.5700	0.01	0.15	88.7
Caelifera species richness	<b>SNH (%)</b>	<b>0.31 ± 0.11</b>	<b>0.0024</b>	<b>0.18</b>	<b>0.00</b>	<b>146.5</b>
	<b>Vineyard (%)</b>	<b>-0.22 ± 0.09</b>	<b>0.0133</b>	<b>0.10</b>	<b>0.00</b>	<b>150.1</b>
	<b>Forest (%)</b>	<b>0.18 ± 0.08</b>	<b>0.0161</b>	<b>0.02</b>	<b>0.00</b>	<b>151.0</b>
	SNH distance (m)	-0.13 ± 0.09	0.1986	0.03	0.00	154.2
	Forest distance (m)	-0.21 ± 0.11	0.0734	0.09	0.00	152.4
	Vegetation height (cm)	0.05 ± 0.09	0.6037	0.01	0.00	155.7
	Bare ground cover (%)	-0.06 ± 0.11	0.5400	0.01	0.03	155.6
	Vegetation cover (%)	0.09 ± 0.09	0.2650	0.02	0.03	154.8
	Shrub cover (%)	-0.01 ± 0.09	0.9190	0.00	0.03	156.0
	Litter cover (%)	0.01 ± 0.09	0.9640	0.00	0.03	156.0
Caelifera density	SNH (%)	0.11 ± 0.06	0.0762	0.06	0.16	77.4
	Vineyard (%)	0.01 ± 0.06	0.9920	0.00	0.16	80.4
	Forest (%)	0.05 ± 0.06	0.4590	0.01	0.16	79.8
	SNH distance (m)	-0.01 ± 0.06	0.9680	0.00	0.16	80.4
	Forest distance (m)	-0.03 ± 0.06	0.5780	0.01	0.16	80.1
	Vegetation height (cm)	0.04 ± 0.06	0.4710	0.01	0.16	79.9
	Bare ground cover (%)	-0.03 ± 0.06	0.5990	0.01	0.17	80.1
	<b>Vegetation cover (%)</b>	<b>0.12 ± 0.06</b>	<b>0.0446</b>	<b>0.07</b>	<b>0.16</b>	<b>76.6</b>
	Shrub cover (%)	0.01 ± 0.06	0.9910	0.00	0.16	80.4
	Litter cover (%)	-0.04 ± 0.06	0.5050	0.01	0.15	79.9
Ensifera species richness	SNH (%)	-0.21 ± 0.18	0.2390	0.04	0.12	127.2
	Vineyard (%)	0.25 ± 0.18	0.1565	0.06	0.12	126.2
	Forest (%)	-0.05 ± 0.19	0.8012	0.01	0.12	128.5
	<b>SNH distance (m)</b>	<b>0.41 ± 0.15</b>	<b>0.0043</b>	<b>0.19</b>	<b>0.00</b>	<b>123.4</b>
	Forest distance (m)	-0.06 ± 0.19	0.7527	0.01	0.26	130.1
	<b>Vegetation height (cm)</b>	<b>0.41 ± 0.13</b>	<b>0.0021</b>	<b>0.13</b>	<b>0.20</b>	<b>119.9</b>
	<b>Bare ground cover (%)</b>	<b>-0.47 ± 0.20</b>	<b>0.0198</b>	<b>0.16</b>	<b>0.26</b>	<b>122.4</b>
	Vegetation cover (%)	-0.02 ± 0.18	0.8931	0.01	0.12	128.5
	Shrub cover (%)	0.17 ± 0.13	0.1888	0.03	0.14	127.1
	<b>Litter cover (%)</b>	<b>0.42 ± 0.18</b>	<b>0.0219</b>	<b>0.13</b>	<b>0.27</b>	<b>122.8</b>
Ensifera density	SNH (%)	-0.03 ± 0.02	0.1670	0.04	0.22	-40.6
	Vineyard (%)	0.03 ± 0.02	0.2090	0.03	0.22	-40.3
	Forest (%)	-0.01 ± 0.02	0.8730	0.01	0.21	-38.8
	<b>SNH distance (m)</b>	<b>0.06 ± 0.02</b>	<b>0.0088</b>	<b>0.12</b>	<b>0.22</b>	<b>-44.9</b>
	Forest distance (m)	0.01 ± 0.03	0.5550	0.01	0.21	-39.1
	<b>Vegetation height (cm)</b>	<b>0.08 ± 0.02</b>	<b>&lt;0.0001</b>	<b>0.24</b>	<b>0.60</b>	<b>-57.4</b>
	<b>Bare ground cover (%)</b>	<b>-0.06 ± 0.02</b>	<b>0.0035</b>	<b>0.11</b>	<b>0.39</b>	<b>-46.4</b>
	Vegetation cover (%)	-0.01 ± 0.02	0.7430	0.01	0.22	-38.8

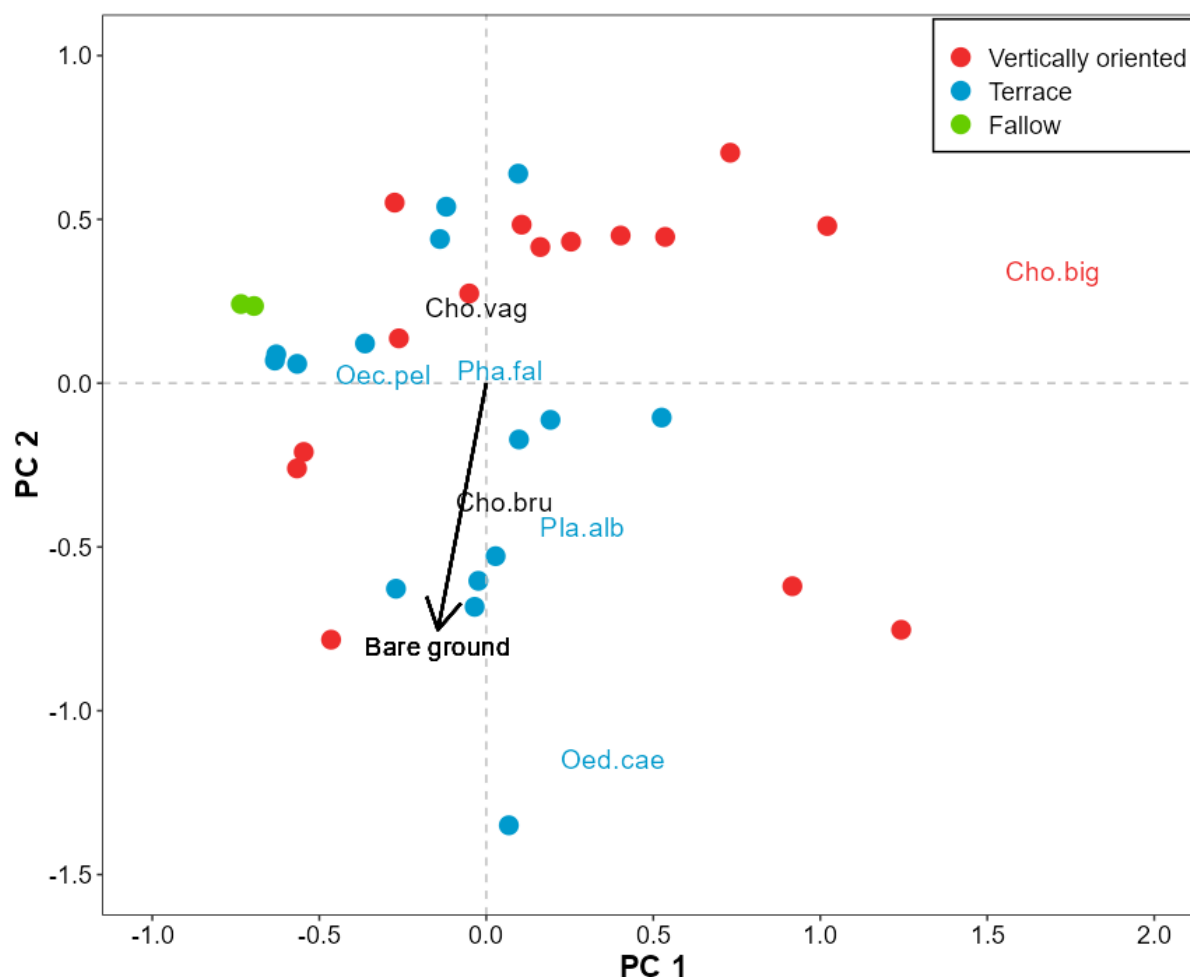
	Shrub cover (%)	0.03 ± 0.02	0.1250	0.04	0.30	-41.0
	<b>Litter cover (%)</b>	<b>0.06 ± 0.02</b>	<b>0.0018</b>	<b>0.13</b>	<b>0.42</b>	<b>-47.5</b>
<i>C. biguttulus</i> density	SNH (%)	0.02 ± 0.06	0.7270	0.01	0.23	63.7
	Vineyard (%)	0.07 ± 0.06	0.2040	0.03	0.23	62.2
	Forest (%)	-0.01 ± 0.06	0.8530	0.01	0.23	63.8
	SNH distance (m)	0.04 ± 0.06	0.5090	0.01	0.23	63.4
	Forest distance (m)	0.02 ± 0.06	0.6890	0.01	0.23	63.6
	Vegetation height (cm)	0.08 ± 0.05	0.0849	0.04	0.31	60.9
	Bare ground cover (%)	-0.08 ± 0.05	0.1010	0.04	0.27	61.2
	<b>Vegetation cover (%)</b>	<b>0.12 ± 0.05</b>	<b>0.0142</b>	<b>0.11</b>	<b>0.26</b>	<b>58.1</b>
	Shrub cover (%)	0.03 ± 0.05	0.5980	0.01	0.26	63.5
	Litter cover (%)	0.01 ± 0.05	0.8460	0.01	0.24	63.8
<i>O. caerulescens</i> density	<b>SNH (%)</b>	<b>-0.05 ± 0.02</b>	<b>0.0122</b>	<b>0.11</b>	<b>0.00</b>	<b>-51.1</b>
	Vineyard (%)	-0.03 ± 0.02	0.1282	0.04	0.00	-47.4
	Forest (%)	0.03 ± 0.02	0.1317	0.04	0.00	-47.4
	SNH distance (m)	-0.02 ± 0.02	0.3816	0.01	0.00	-45.9
	Forest distance (m)	-0.03 ± 0.02	0.1791	0.03	0.00	-47.0
	Vegetation height (cm)	-0.02 ± 0.02	0.3462	0.02	0.10	-46.1
	<b>Bare ground cover (%)</b>	<b>0.06 ± 0.02</b>	<b>0.0008</b>	<b>0.16</b>	<b>0.00</b>	<b>-55.4</b>
	Vegetation cover (%)	-0.02 ± 0.02	0.4278	0.01	0.00	-48.8
	Shrub cover (%)	-0.03 ± 0.02	0.2147	0.03	0.00	-46.7
	<b>Litter cover (%)</b>	<b>-0.05 ± 0.02</b>	<b>0.0065</b>	<b>0.12</b>	<b>0.00</b>	<b>-52.2</b>

**Table S4:** Correlation of environmental and landscape variables with the first two DCA components related to Orthoptera species composition in vineyard compartments. Variables that were significantly related to the DCA axes ( $p < 0.05$ , 9999 permutations) are printed in bold. Asterisks indicate significance levels ( $p < 0.05 = *$ ,  $p < 0.005 = **$ ); SNH: semi-natural habitat.

Variable	DCA1	DCA2	Pr (>r)
SNH (%)	0.2768	-0.9609	0.0610
<b>Vineyard (%)</b>	<b>-0.6143</b>	<b>0.9981</b>	<b>0.0230 *</b>
Forest (%)	-0.0978	-0.9952	0.3890
<b>SNH distance (m)</b>	<b>-0.1455</b>	<b>0.8943</b>	<b>0.0020 **</b>
Forest distance (m)	0.4476	0.8942	0.4650
Vegetation height (cm)	-0.1116	0.9938	0.2260
<b>Bare ground cover (%)</b>	<b>-0.8813</b>	<b>-0.4727</b>	<b>0.0290 *</b>
Vegetation cover (%)	0.4355	-0.9002	0.4490
Shrub cover (%)	0.4596	0.8879	0.3140
<b>Litter cover (%)</b>	<b>0.6258</b>	<b>0.7800</b>	<b>0.0260 *</b>

**Table S5:** Correlation of environmental and landscape variables with the first two PCA components related to Orthoptera species composition in vineyard types. Variables that were significantly related to the PCA axes ( $p < 0.05$ , 9999 permutations) are printed in bold. Asterisks indicate significance levels ( $p < 0.005=**$ ); SNH: semi-natural habitat.

Variable	PC1	PC2	Pr (>r)
SNH (%)	0.0842	-0.9965	0.1370
Vineyard (%)	0.4296	0.9030	0.1920
Forest (%)	-0.9833	-0.1823	0.6530
SNH distance (m)	0.8418	0.5398	0.4540
Forest distance (m)	0.4777	0.8785	0.2390
Vegetation height (cm)	-0.5822	-0.8130	0.7890
<b>Bare ground cover (%)</b>	<b>-0.1889</b>	<b>-0.9819</b>	<b>0.0060 **</b>
Vegetation cover (%)	0.9774	0.2113	0.4920
Shrub cover (%)	-0.7962	0.6051	0.0790
Litter cover (%)	0.1444	0.9896	0.0580



**Figure S1.** PCA results for Orthoptera species composition of vineyard types. The first component explained 38.99 % of variance, the second component 22.28 %. Dots show sample scores for vertically oriented vineyards (red), terraced vineyards (blue) and fallows (green). Environmental and landscape variables that were significantly related to the PCA axes ( $p < 0.05$ , 9999 permutations) were included post-hoc by projection. Indicator species are colored in red for vertically oriented vineyards and in blue for terraced vineyards. For black-colored species names, no assigned indicator values were available. Cho.big: *Chorthippus biguttulus*;

Cho.bru: *Chorthippus brunneus*; Cho.vag: *Chorthippus vagans*; Oec.pel: *Oecanthus pellucens*; Oed.cae: *Oedipoda caerulescens*; Pha.fal: *Phaneroptera falcata*; Pla.alb: *Platycleis albopunctata*.