

Table S1. List of plant species communities with one, four, eight, and 16 plant species, providing plot IDs, sampling year, sucrose concentration [%] as measured for one sample with a hand-held refractometer, and the numbers and actual species of other plant species flowering and not flowering when *Knautia arvensis* was flowering in 2011. Nectar sampling was performed in 2010 and /or 2012. n.a. indicates that there was no data available.

Plant species mixtures	Plot ID	Year of sampling	Sucrose [%]	Number of flowering plant species competing with <i>K. arvensis</i>	Flowering plant species	Not flowering plant species
1				0	-	-
	B1B063	2010	27			
		2012	32			
4				2	<i>Campanula patula</i>	<i>Cardamine pratensis</i>
	B4A22	2012	70		<i>Geranium pratense</i>	
8				5	<i>Anthriscus sylvestris</i>	<i>Heracleum sphondylium</i>
	B2A12	2012	60		<i>Galium mollugo</i>	<i>Sanguisorba officinalis</i>
					<i>Geranium pratense</i>	
					<i>Leucanthemum vulgare</i>	
					<i>Ranunculus acris</i>	
8				2	<i>Leontodon hispidus</i>	<i>Luzula campestris</i>
	B2A14	2012	41		<i>Veronica chamaedrys</i>	<i>Phleum pratense</i>
						<i>Sanguisorba officinalis</i>
						<i>Trifolium dubium</i>
						<i>Trifolium hybridum</i>
8				4	<i>Heracleum sphondylium</i>	<i>Campanula patula</i>
	B3A20	2010	n. a.		<i>Lotus corniculatus</i>	<i>Cardamine pratensis</i>
		2012	71		<i>Trifolium fragiferum</i>	<i>Trifolium campestre</i>
					<i>Trifolium hybridum</i>	
16				10	<i>Achillea millefolium</i>	<i>Ajuga reptans</i>
	B1A20	2012	57		<i>Bellis perennis</i>	<i>Leontodon autumnalis</i>
					<i>Geranium pratense</i>	<i>Medicago varia</i>
					<i>Leontodon hispidus</i>	<i>Sanguisorba officinalis</i>
					<i>Lotus corniculatus</i>	<i>Trifolium hybridum</i>
					<i>Onobrychis viciifolia</i>	
					<i>Plantago lanceolata</i>	
					<i>Ranunculus acris</i>	
					<i>Trifolium repens</i>	
					<i>Veronica chamaedrys</i>	
16				5	<i>Galium mollugo</i>	<i>Anthriscus sylvestris</i>
	B4A02	2010	30			
		2012	30		<i>Heracleum sphondylium</i>	<i>Arrhenatherum elatius</i>
					<i>Leontodon hispidus</i>	<i>Cynosurus cristatus</i>
					<i>Pastinaca sativa</i>	<i>Glechoma hederacea</i>

Plantago media

Luzula campestris

Phleum pratense

Poa pratensis

Ranunculus acris

Ranunculus repens

Taraxacum officinale

Observations of flower visitors (for Table S2 and Table S3)

We related plant species richness to the diversity and abundance of specific flower visitor guilds and the entire flower-visiting community of *Knautia arvensis* (L.) Coult.(Asteraceae) growing in different plant communities, because *K. arvensis* typically attracts many different flower visitors, including solitary bees, bumblebees, honeybees (*Apis mellifera* Linnaeus, 1758) and hoverflies [2–4].

Flower-visiting insects, e.g. honeybees, bumblebees, solitary bees and hoverflies, had been surveyed within the framework of the Jena Experiment on a subset of plots between May and August 2011 (see [5] for details on flower-visitor observations). Thus, nectar sampling and flower-visitor observations were performed at different years. We extracted all observations on flower visitors to *K. arvensis* for those plots for which we also had collected nectar, i.e. two 8-species plots and one 16-species plot. Flower visitors were grouped to honeybees, bumblebees, solitary bees and hoverflies for subsequent analyses, and we defined all solitary bees as non-eusocial Apidae [6]. We summed all flower visitors across all observations performed in 2011 and calculated per plot overall abundance and abundances for different groups as well as overall visitor species richness and the visitor species richness in each group, resulting in a sample size of three.

Notably, the observed and presented visitation patterns should not be considered representative for *Knautia arvensis* in general, as they only provide a snapshot for a largely artificial set-up and for only one year. This is also why this data is only provided as supplementary material.

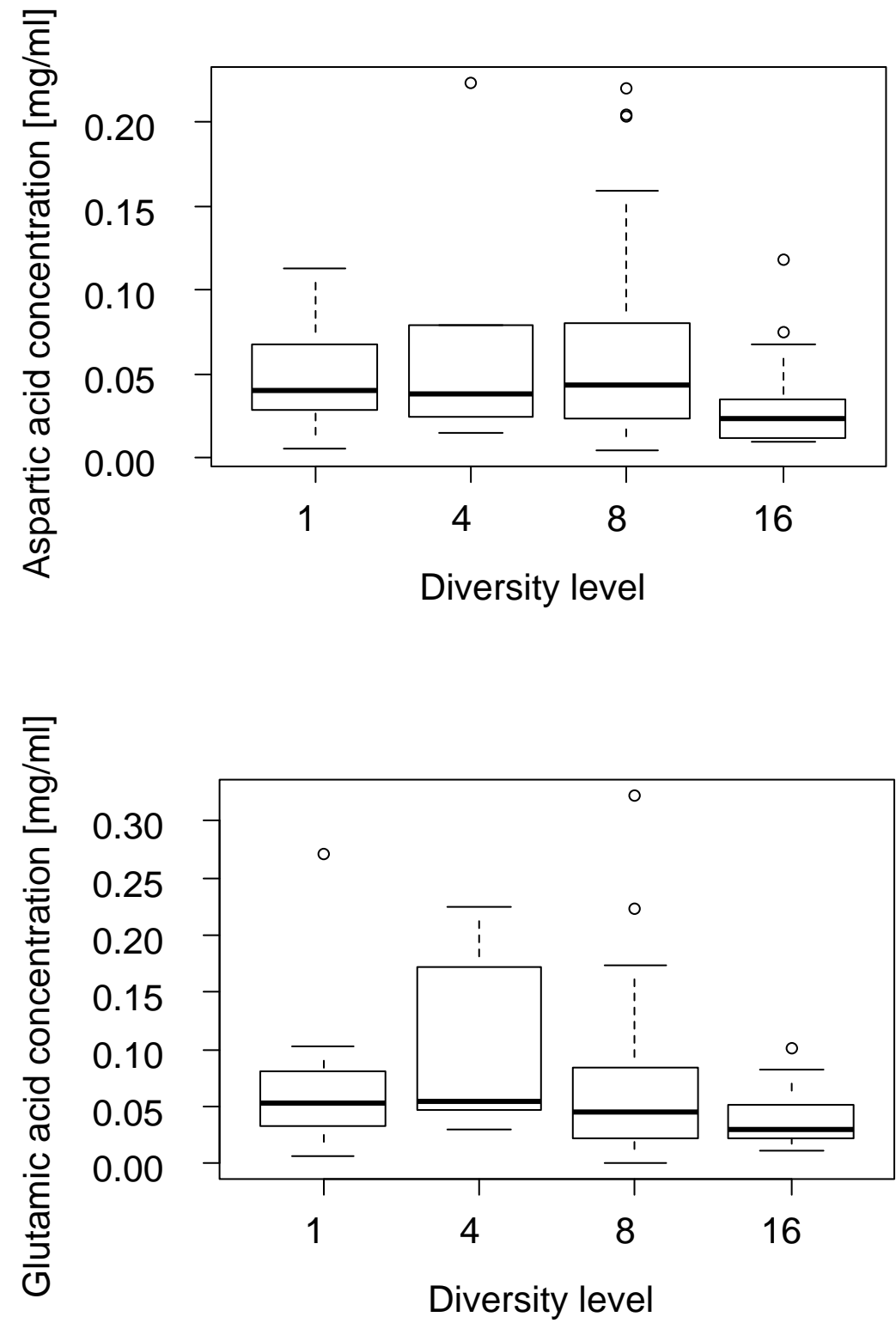
Table S2. List of individual flower visitors to all *Knautia arvensis* in plant species communities with eight and 16 plant species observed in 2011 (one plot per community with plot number in brackets for further details see [5]. Flower visitors are grouped into beetles, bumblebees, butterflies, flies, honeybees, hoverflies, solitary bees, and wasps (bold letters, alphabetical order). Note that nectar sampling was performed on the same plots, but in different years (2010 and 2012). Observations were performed on the same plots in 2011 from which nectar were taken in 2010 and 2012 for eight and 16 plant species communities.

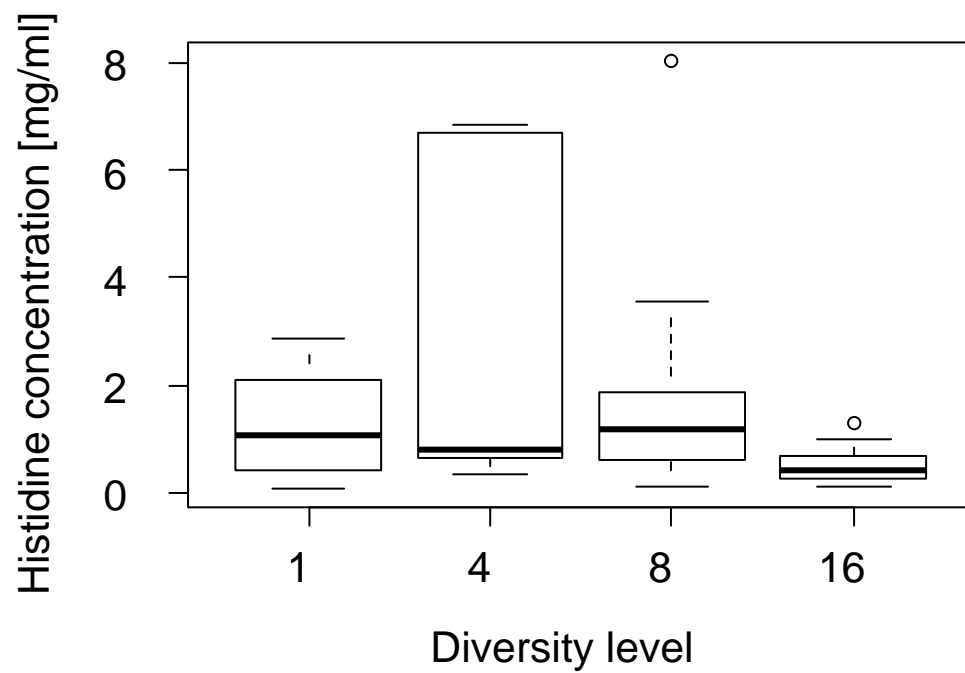
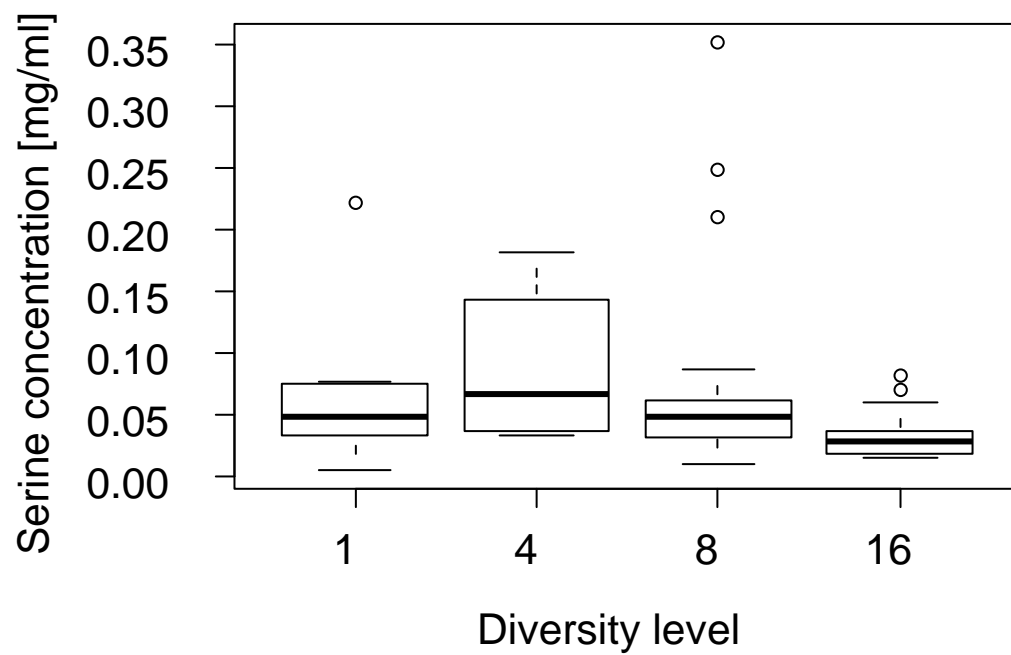
Flower visitors of <i>Knautia arvensis</i>			
per species community	8	8	16
	(B3A20)	(B2A12)	(B1A20)
Beetles	-	-	-
Coleoptera unidentified	-	3	9
Bumblebees			
<i>Bombus lapidarius</i> (Linnaeus, 1758)	14	39	31
<i>Bombus pascuorum</i> (Scopoli, 1763)	-	1	1
<i>Bombus pratorum</i> (Linnaeus, 1761)	8	-	1
<i>Bombus soroeensis</i> (Fabricius, 1776)	-	2	-
<i>Bombus sylvarum</i> (Linnaeus, 1761)	1	-	-
<i>Bombus terrestris</i> (Linnaeus, 1758)	5	4	2
<i>Bombus veteranus</i> (Fabricius, 1793)	-	-	1
<i>Bombus</i> spec.	-	3	-
Butterflies			
<i>Araschnia levana</i> (Linnaeus, 1758)	-	-	2
<i>Pieris</i> spec.	-	1	1
Lepidoptera unidentified	-	1	7
Flies			
<i>Bombylius venosus</i> (Mikan, 1796)	-	3	-
Brachycera unidentified	-	2	2
Honeybees			
<i>Apis mellifera</i> (Linnaeus, 1758)	195	230	303
Hoverflies			
<i>Episyrphus balteatus</i> (Dujardin, 1842)	-	3	6
<i>Eristalis jugorum</i> (Egger, 1858)	-	-	-
<i>Eristalis tenax</i> (Linnaeus, 1758)	-	2	-
<i>Melanostoma mellinum</i> (Linnaeus, 1758)	1	-	2
<i>Scaeva pyrastris</i> (Linnaeus, 1758)	2	-	-
<i>Syrpitta pipiens</i> (Linnaeus, 1758)	1	-	-
Syrphidae unidentified	2	3	9
Solitary bees			
<i>Andrena cineraria</i> (Linnaeus, 1758)	-	-	-
<i>Andrena hattorfiana</i> (Fabricius, 1775)	-	-	-
<i>Halictus scabiosae</i> (Rossi, 1790)	-	-	1
<i>Lasioglossum calceatum</i> (Scopoli, 1763)	-	-	1
<i>Lasioglossum leucozonium</i> (Schrank, 1781)	-	2	-
<i>Lasioglossum villosulum</i> (Kirby, 1802)	-	-	1
Solitary bees unidentified	3	-	3
Wasps			
<i>Lindenius</i> spec.	-	1	-

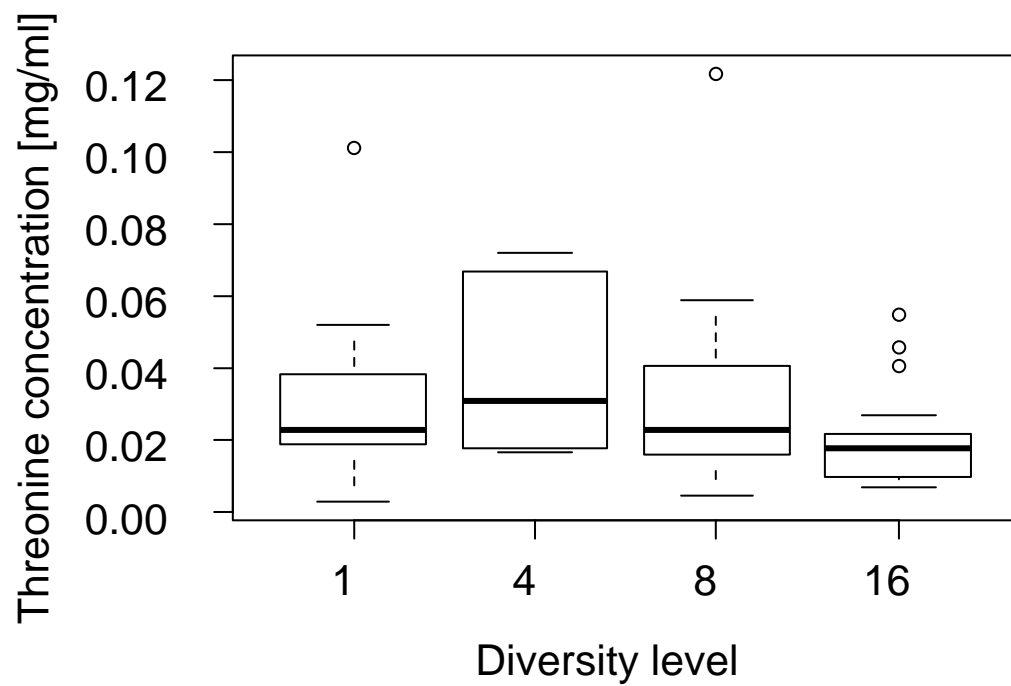
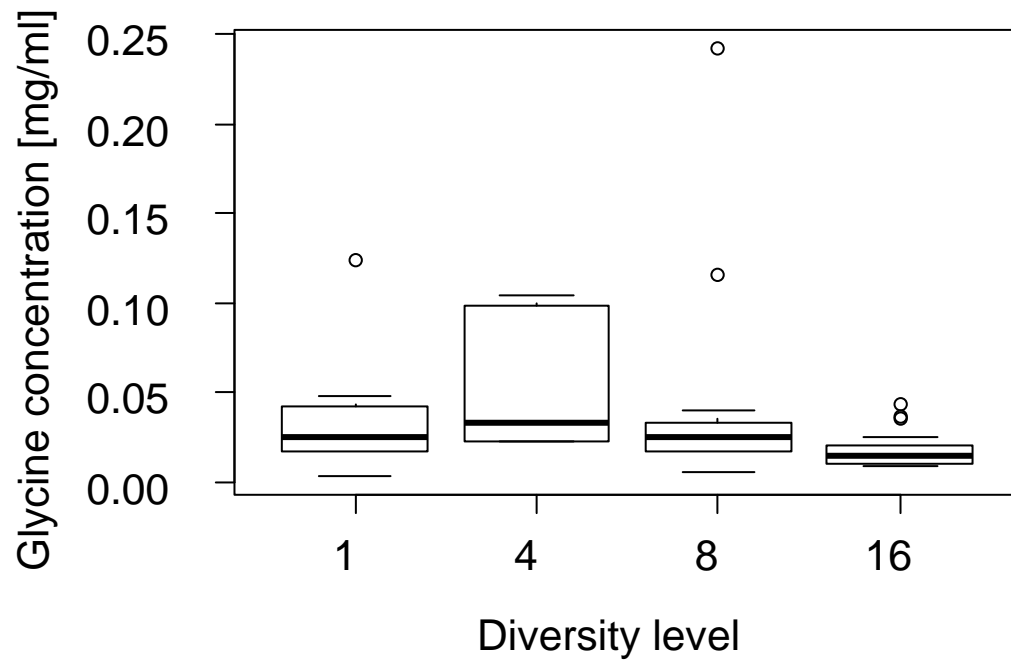
Table S3. Total numbers, species richness, guild numbers and Shannon diversity [7] of flower visitors to *Knautia arvensis* growing in plant species communities of four, eight, and 16 plant species.

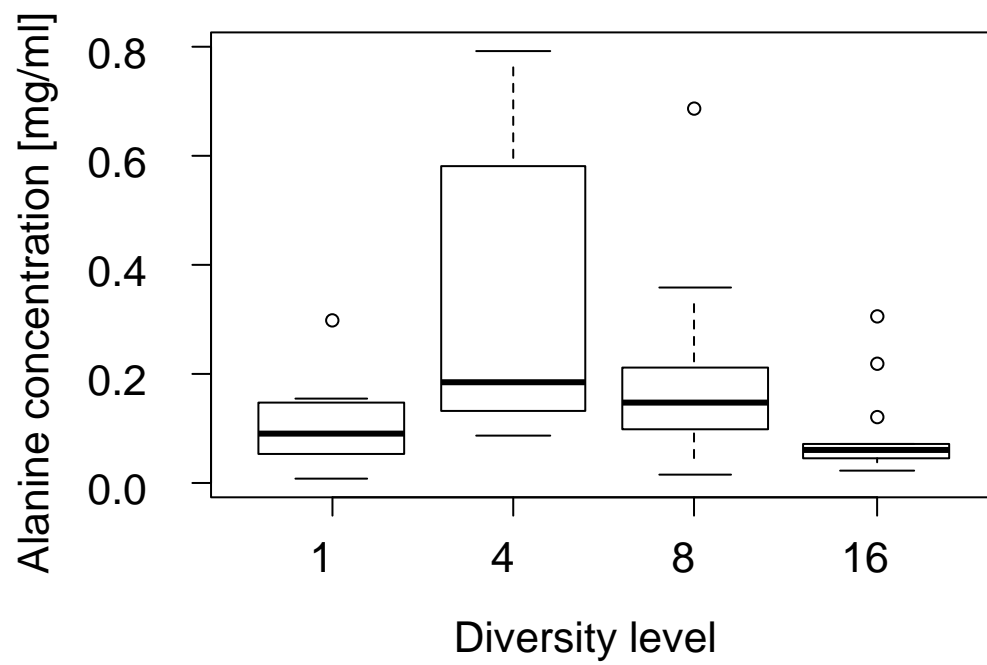
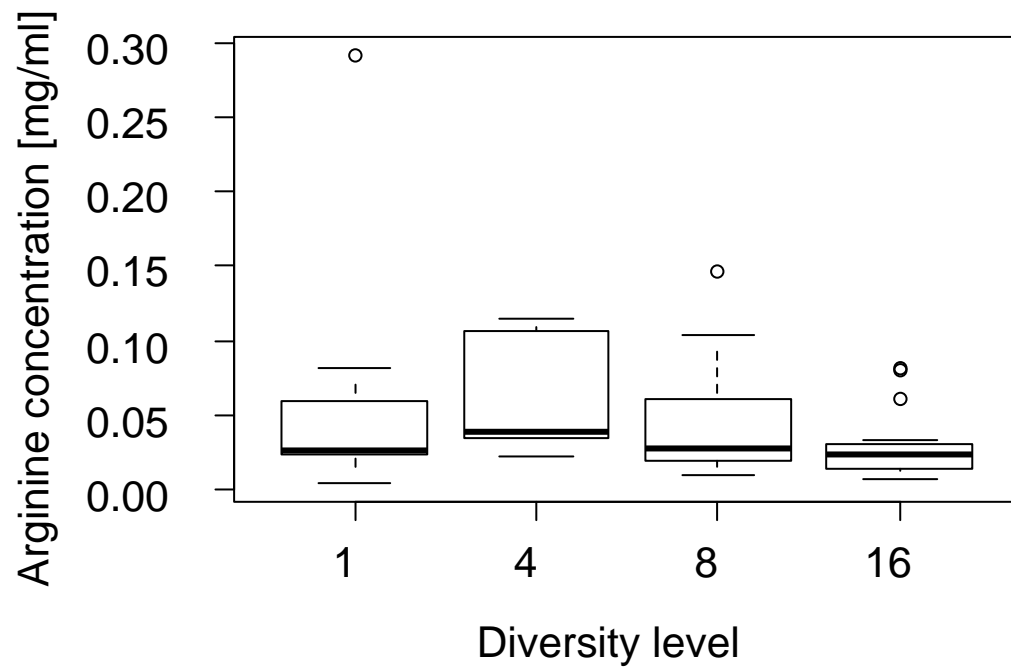
Plant species community	8	8	16
Shannon Index	0.72	0.97	0.96
Total numbers	232	300	383
Species richness of flower visitors	9	12	15
Beetles	-	3	9
Bumblebees	28	49	36
Butterflies	-	2	10
Flies	-	5	2
Honeybees	195	230	303
Hoverflies	6	8	17
Solitary bees	3	2	6
Wasps	-	1	-

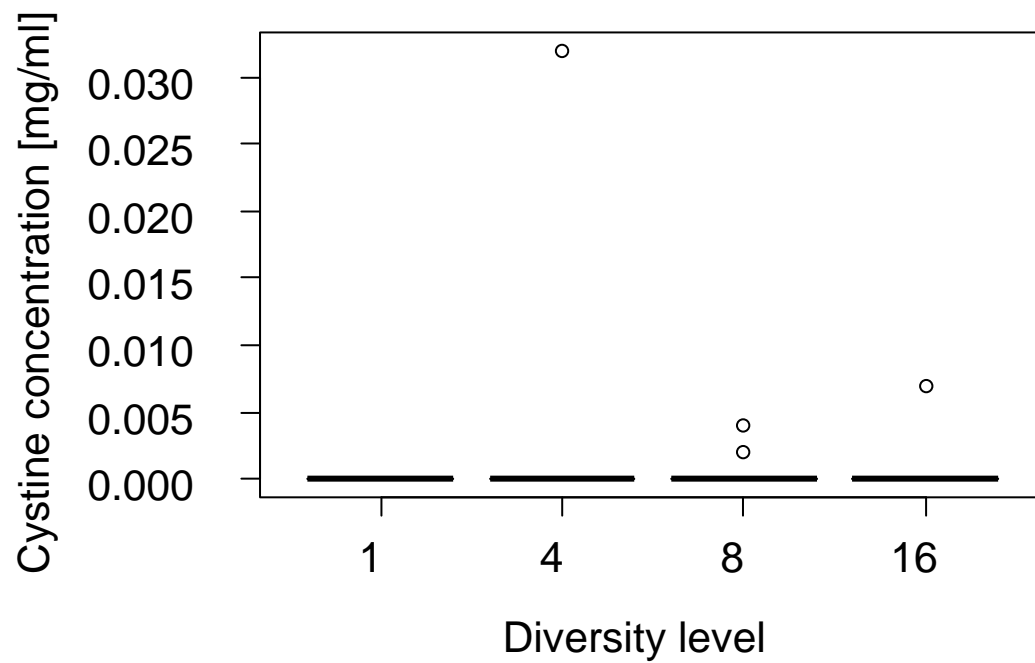
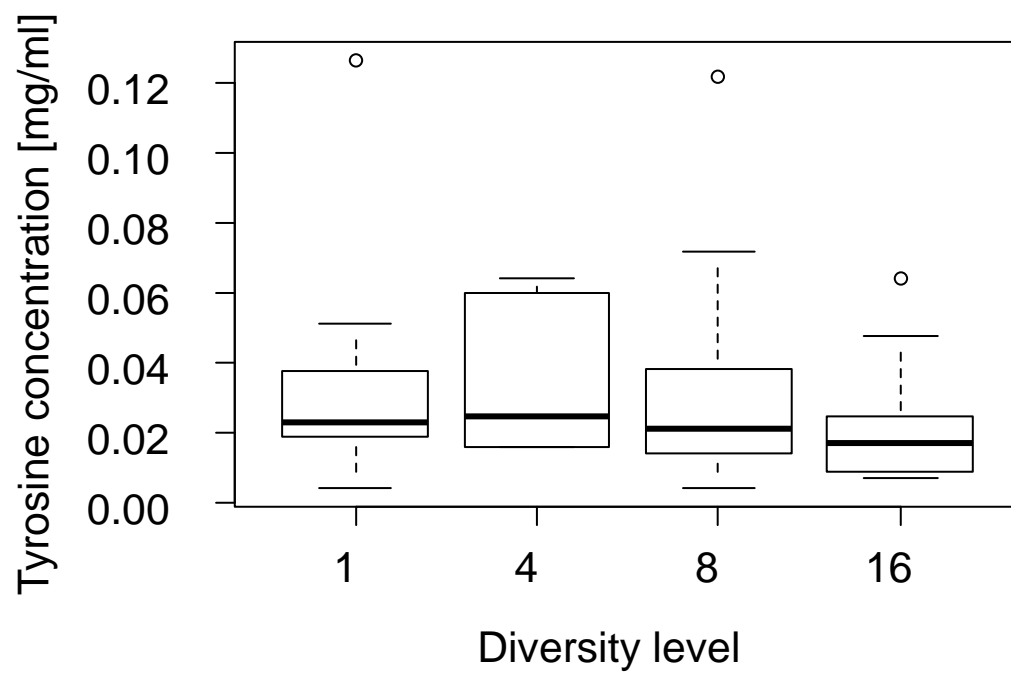
Figure S2. List of figures presenting the mean [\pm SD] concentrations and proportions of individual amino acids and carbohydrates as well as total amino acids (AA), all essential amino acids (EAA) and all non-essential amino acids (nEAA) as found in floral nectar of *Knautia arvensis* from different plant species mixtures, i.e. monoculture, four, eight, and 16 plant species mixtures. The figure correspond to Table 1.

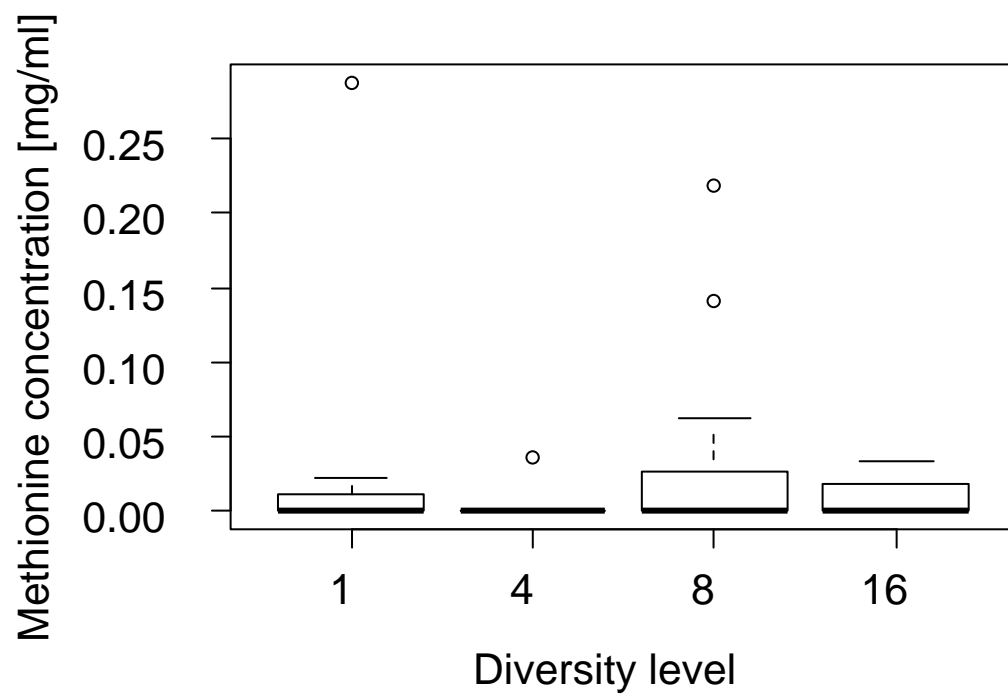
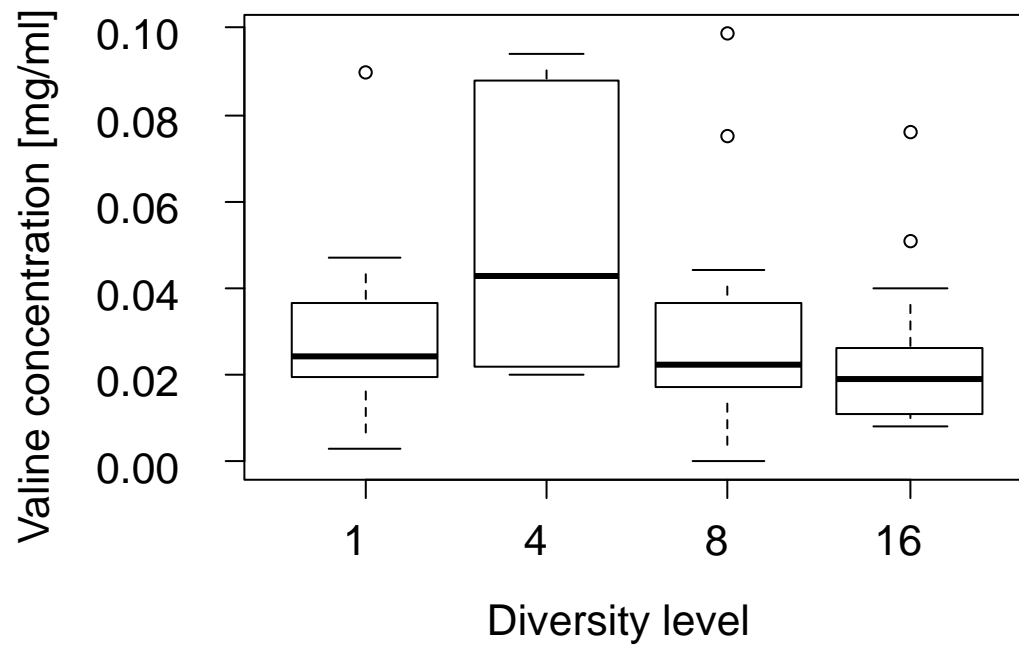


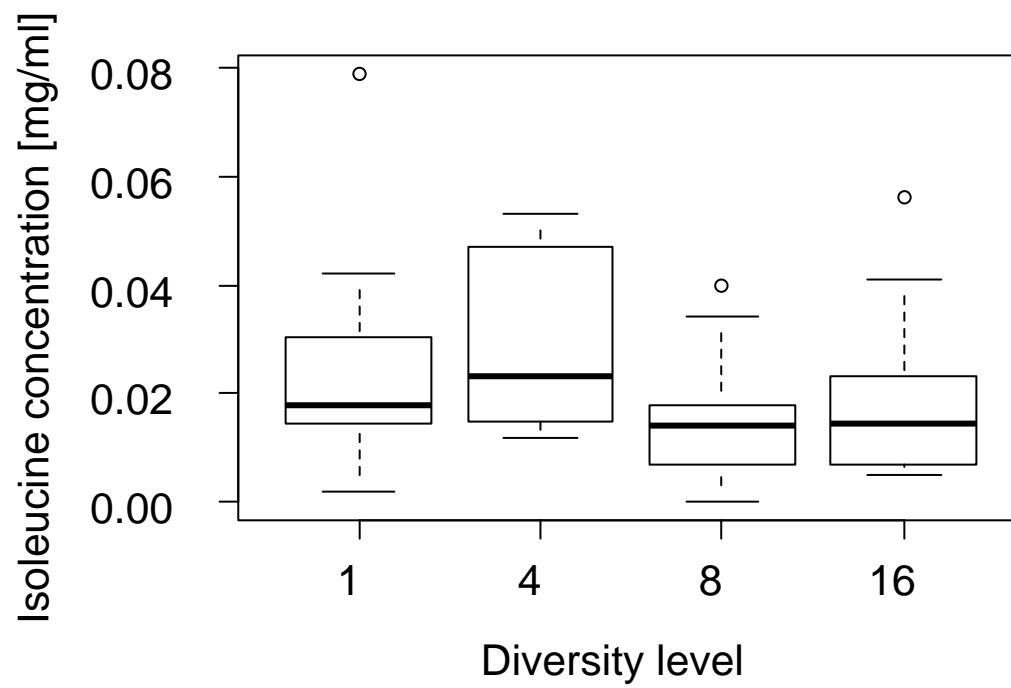
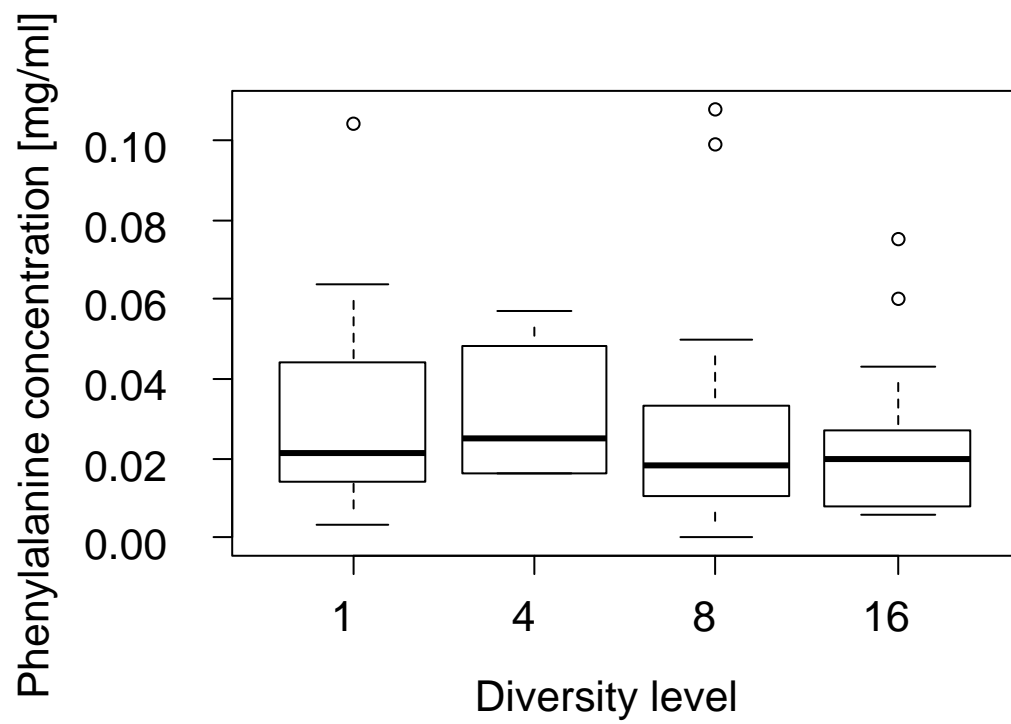


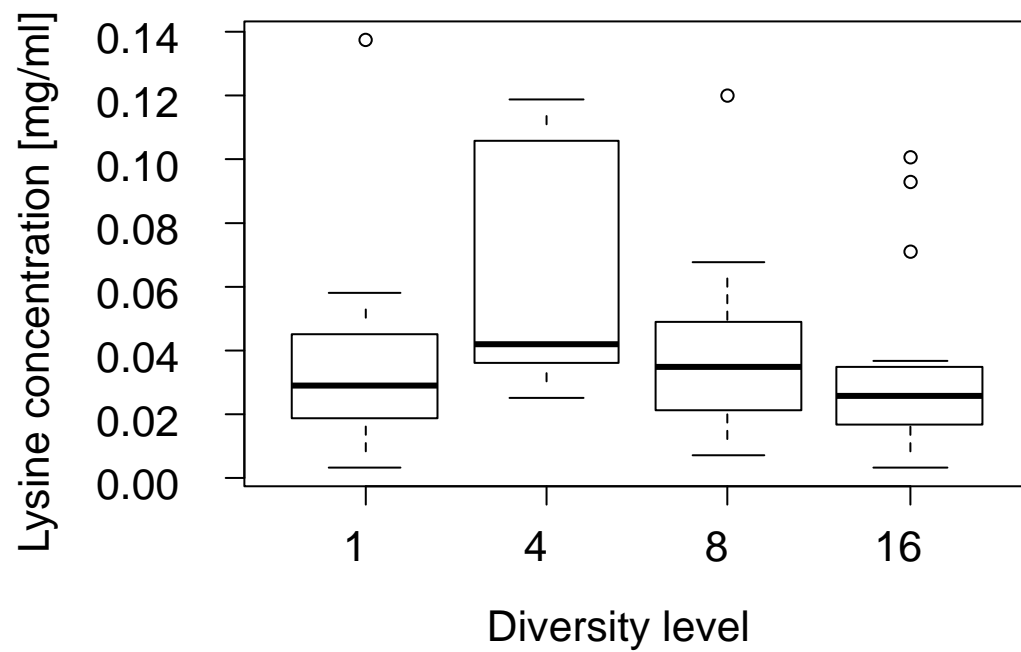
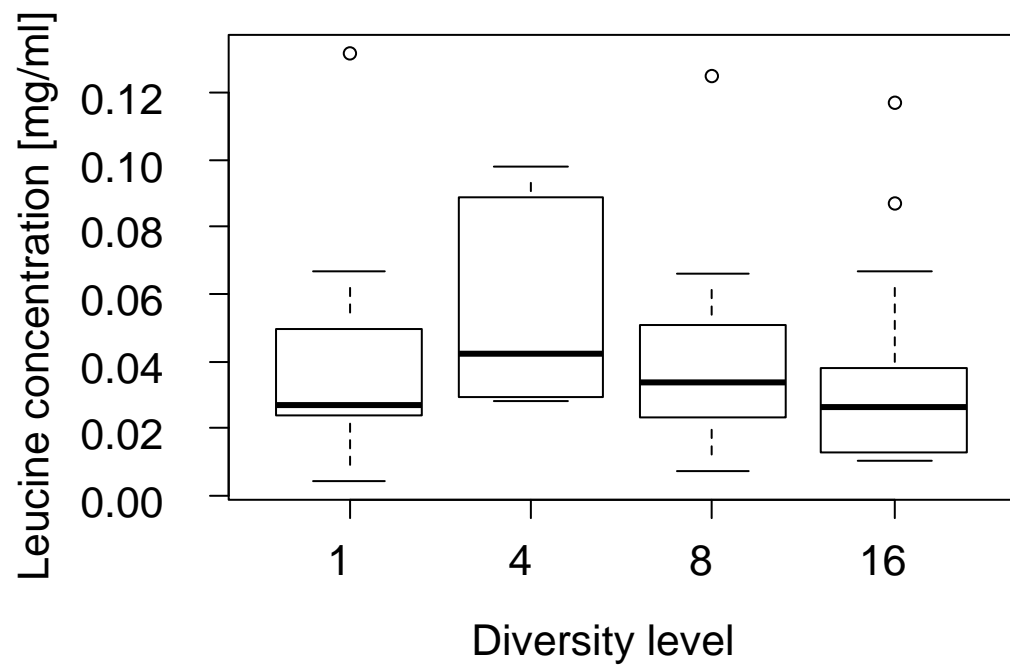


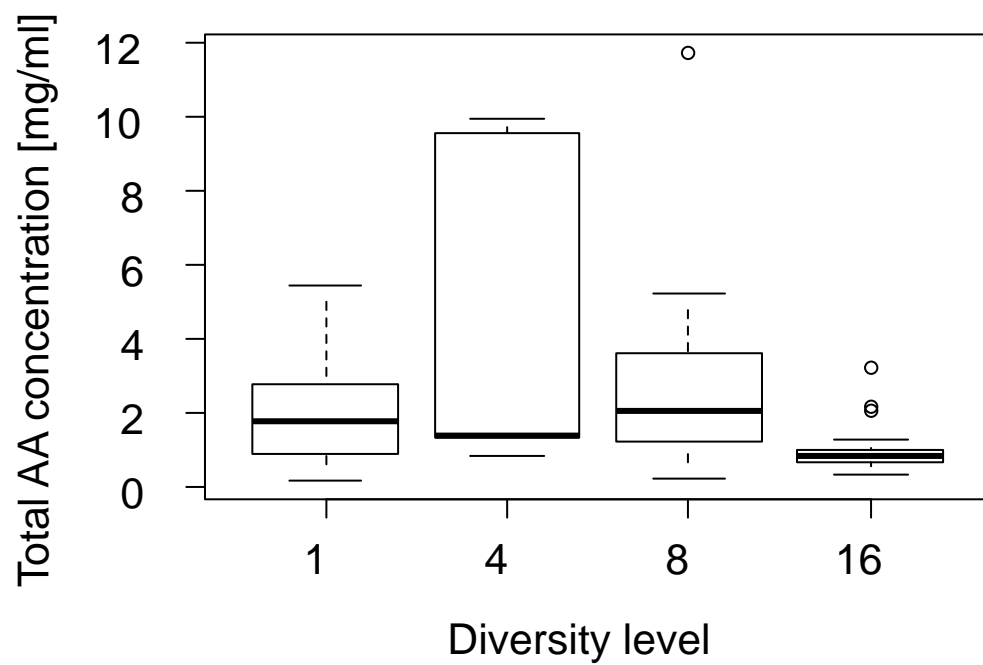
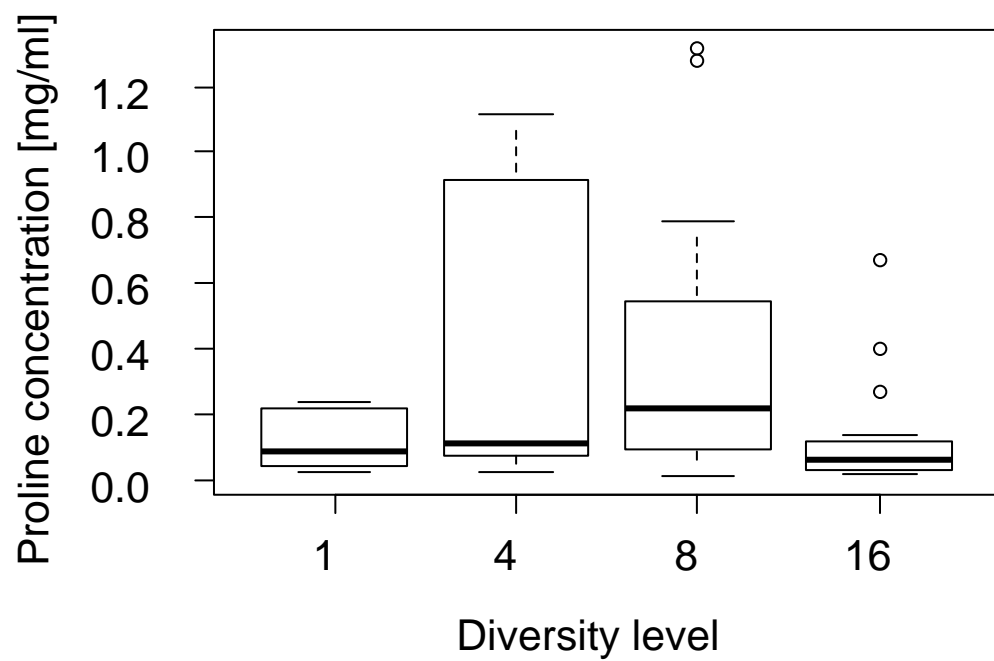


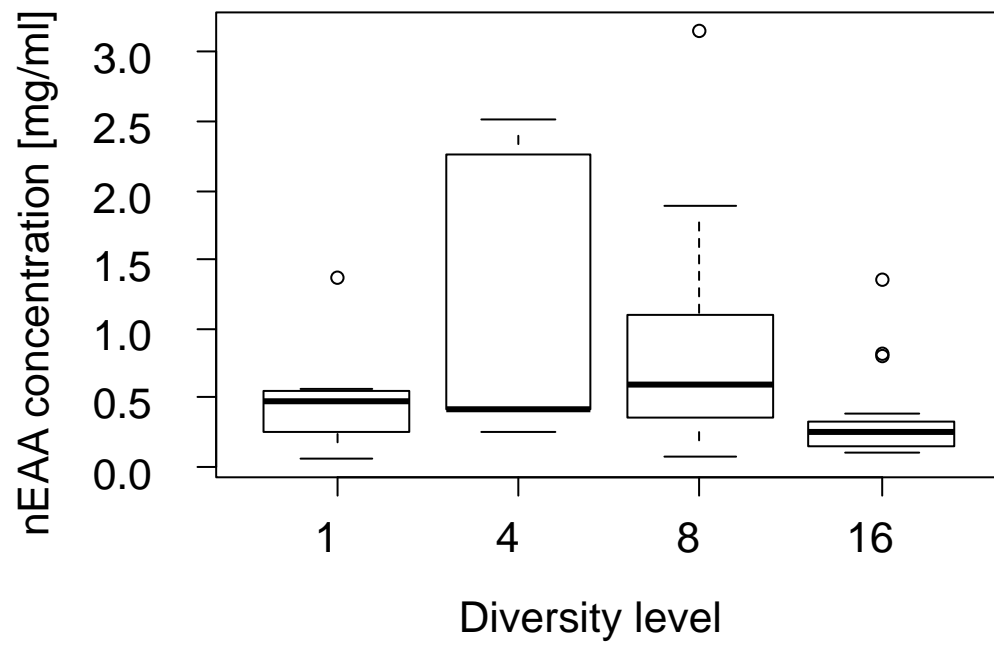
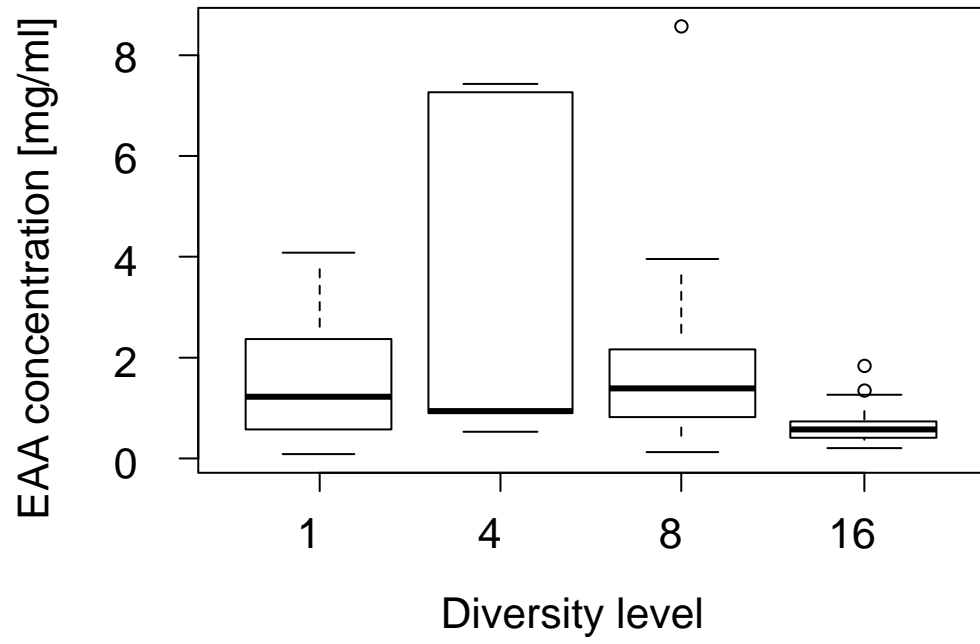


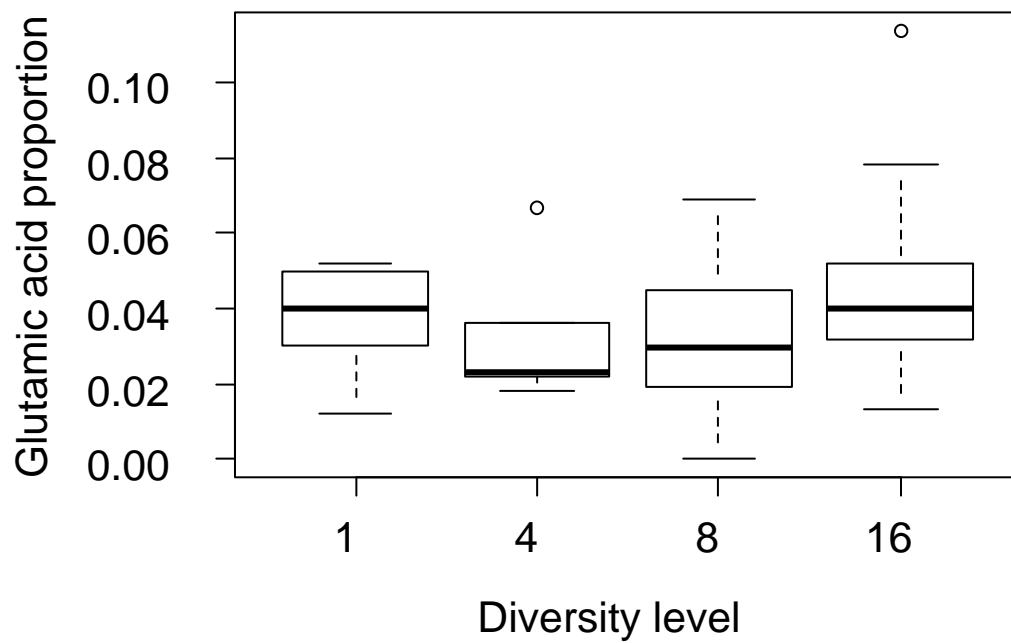
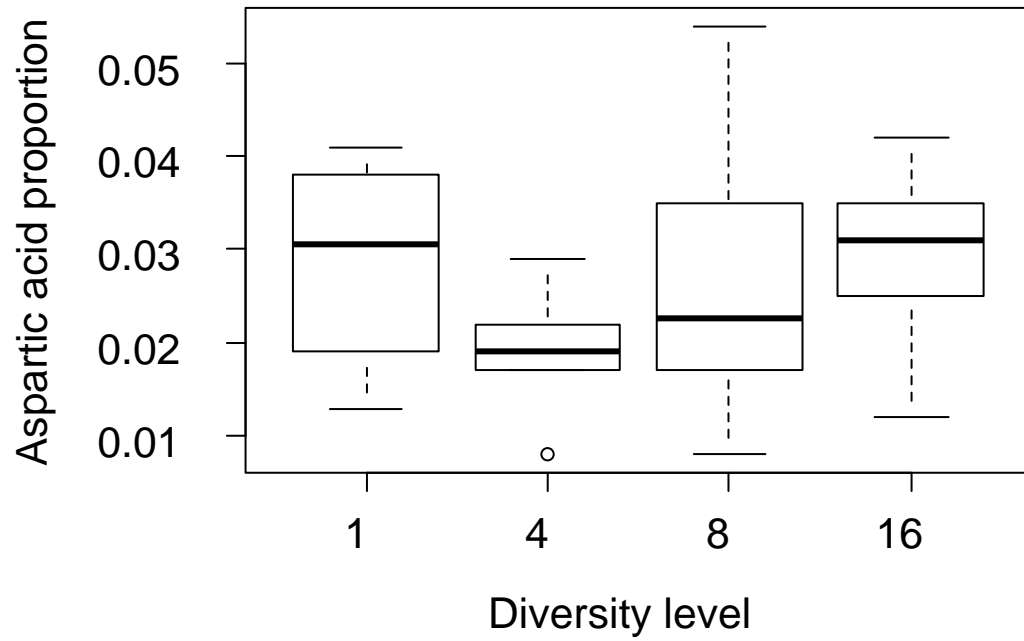


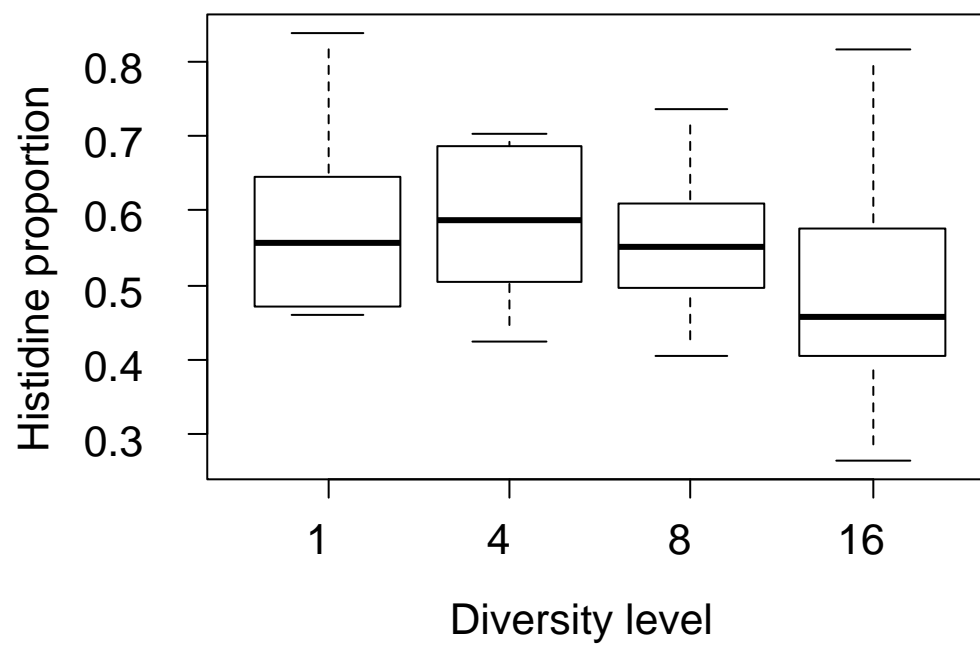
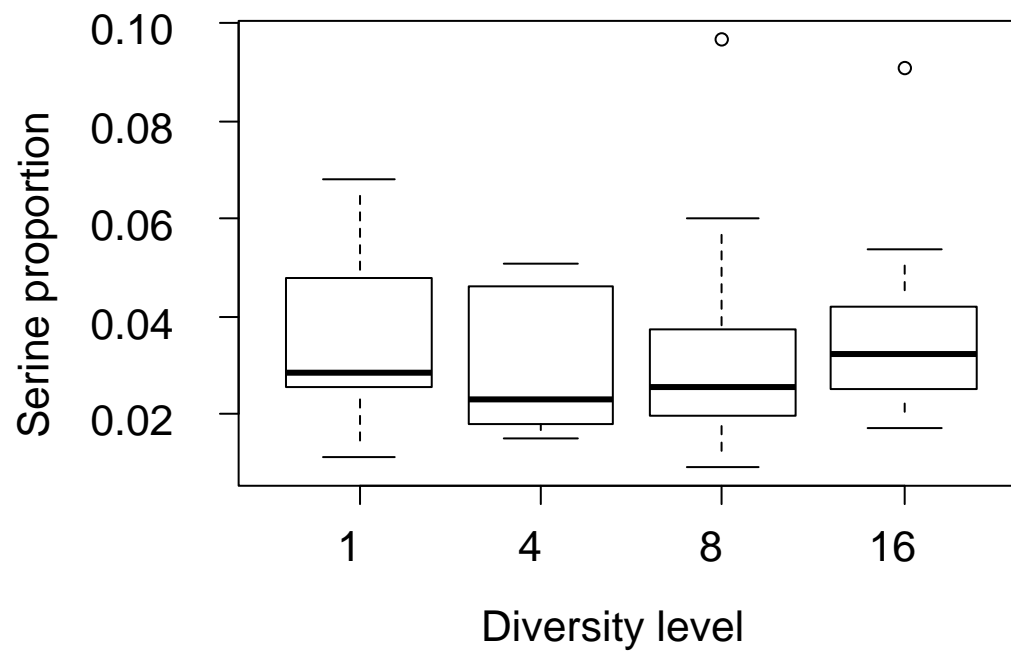


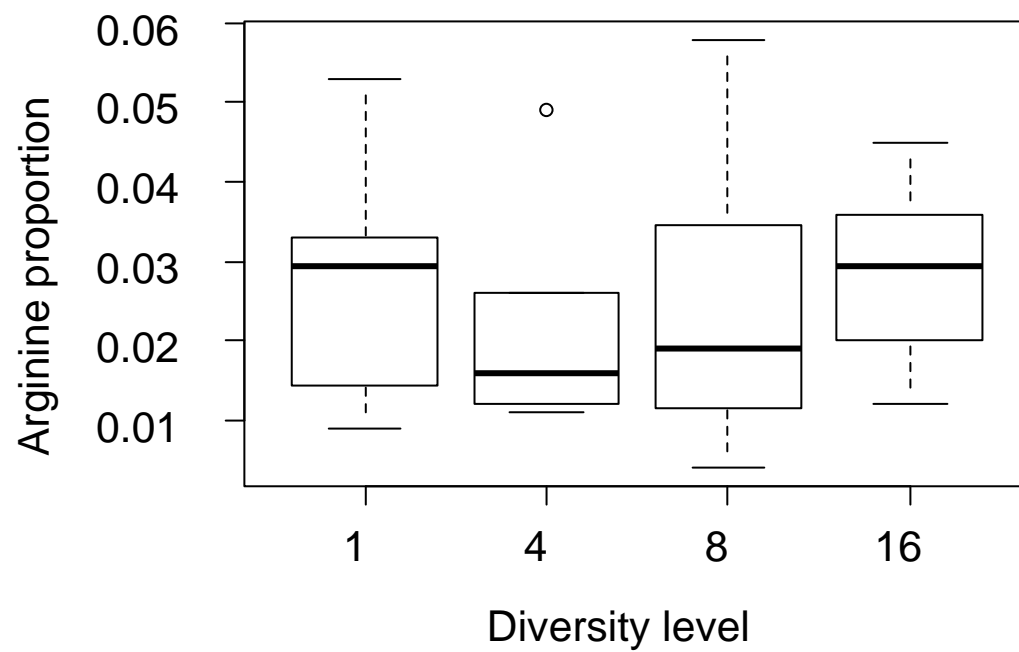
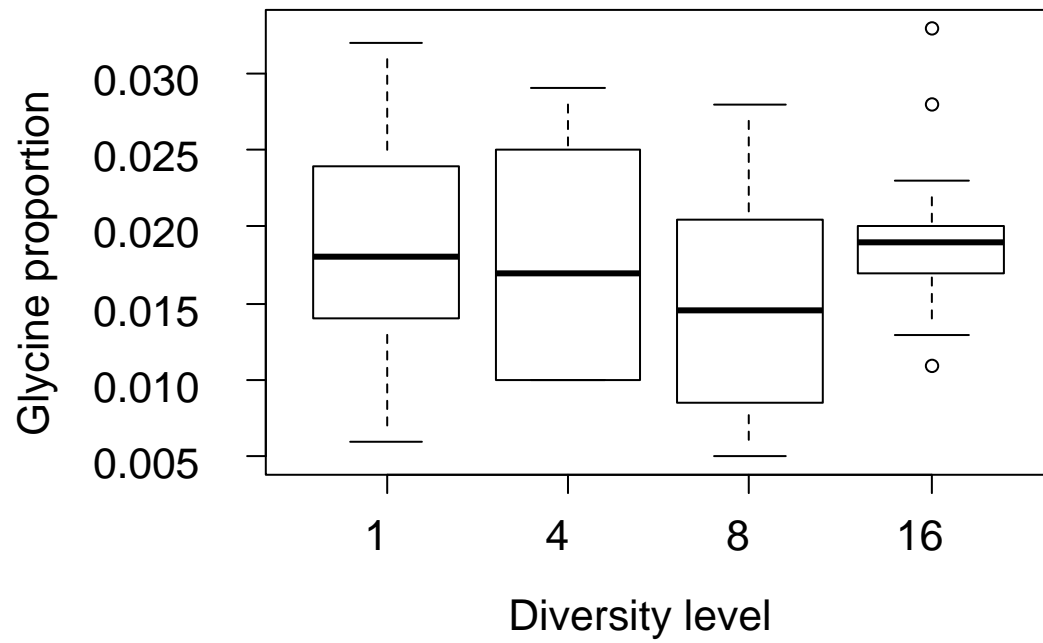


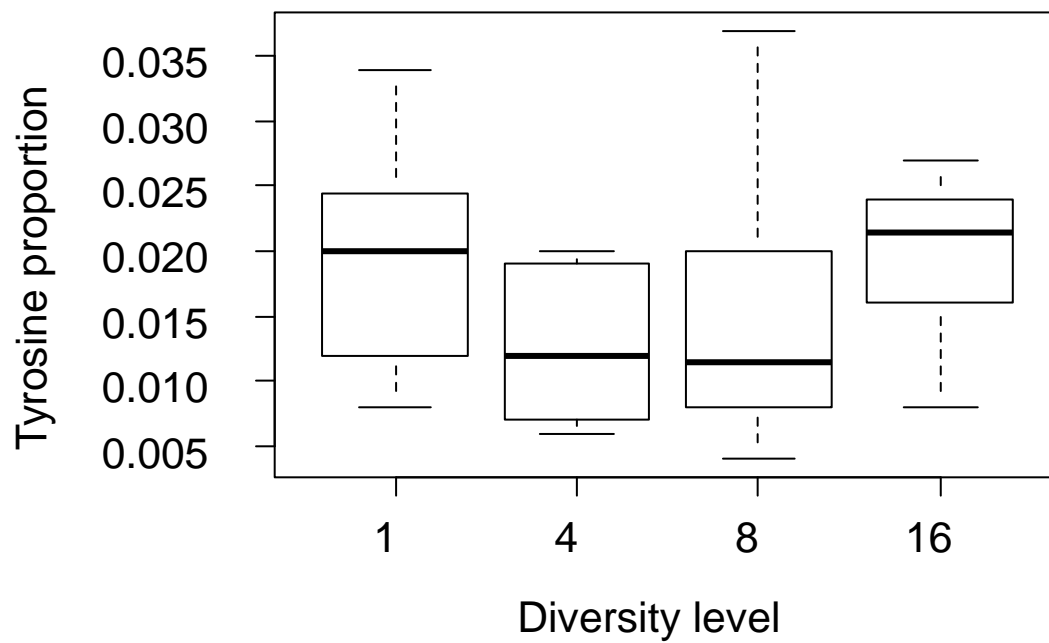
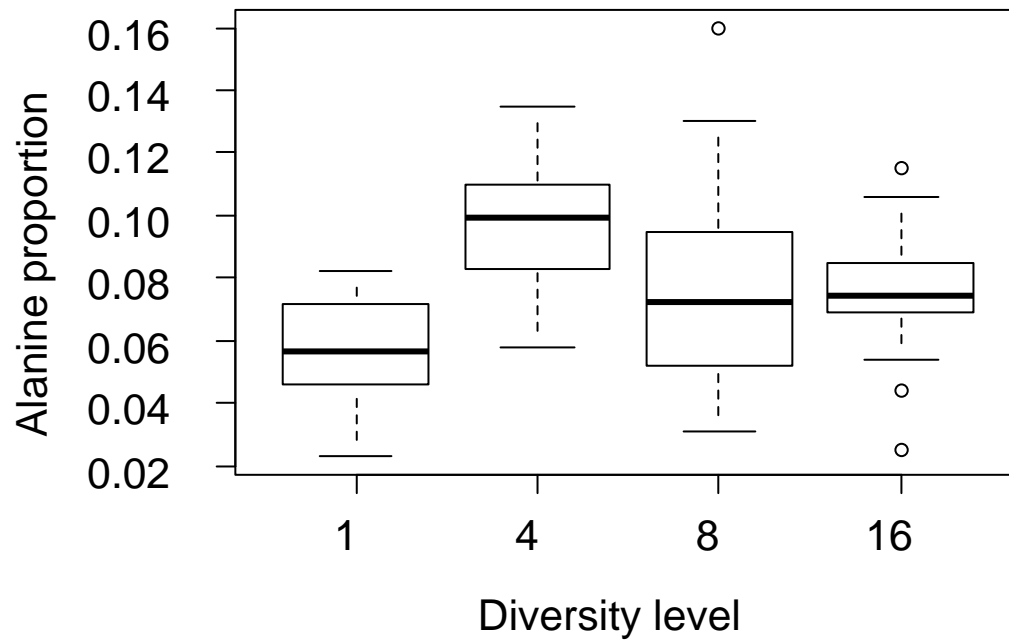


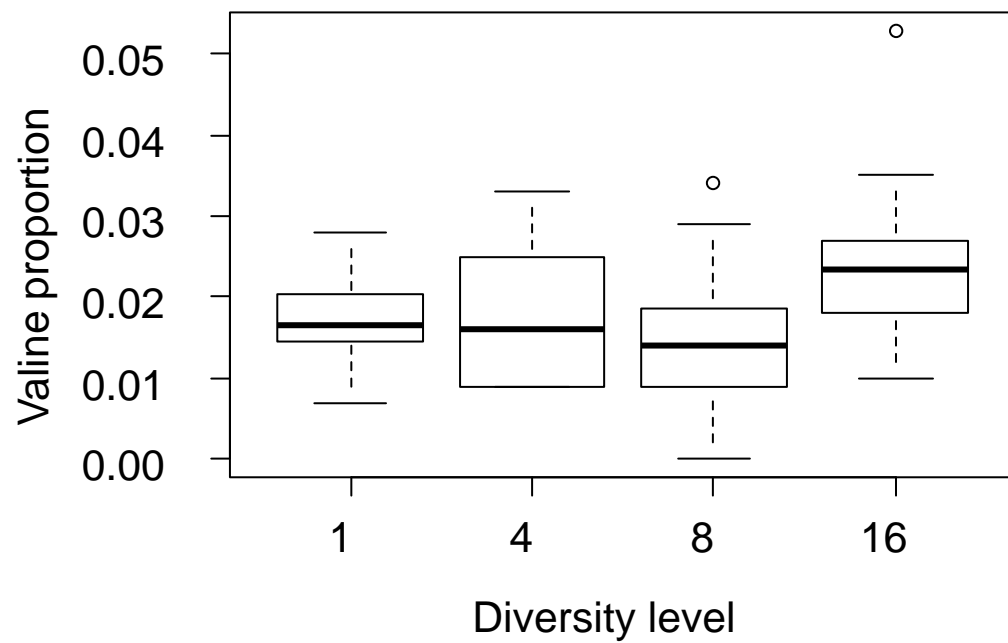
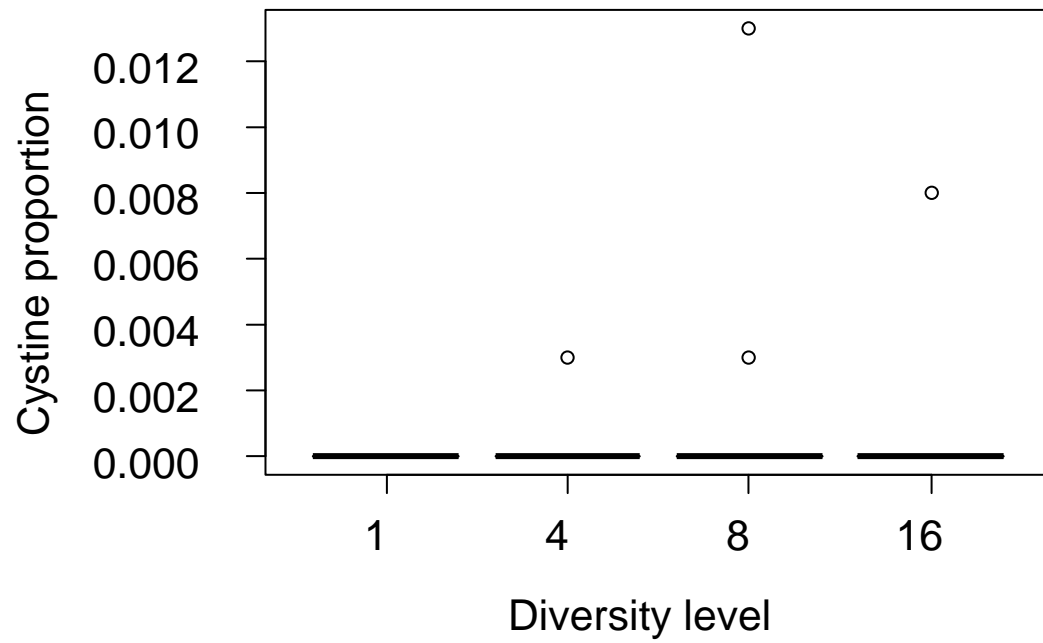


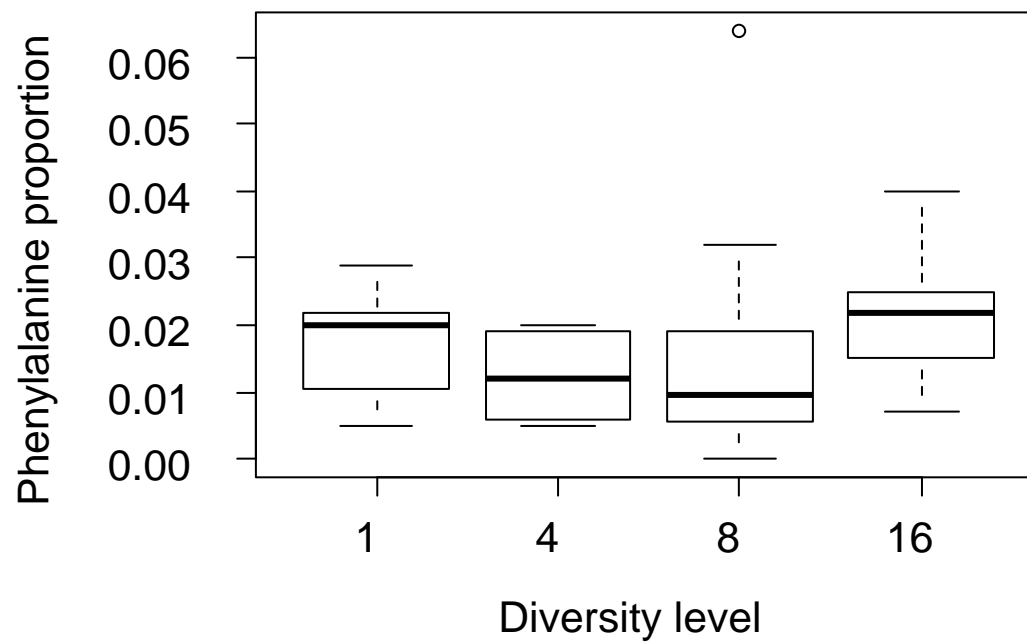
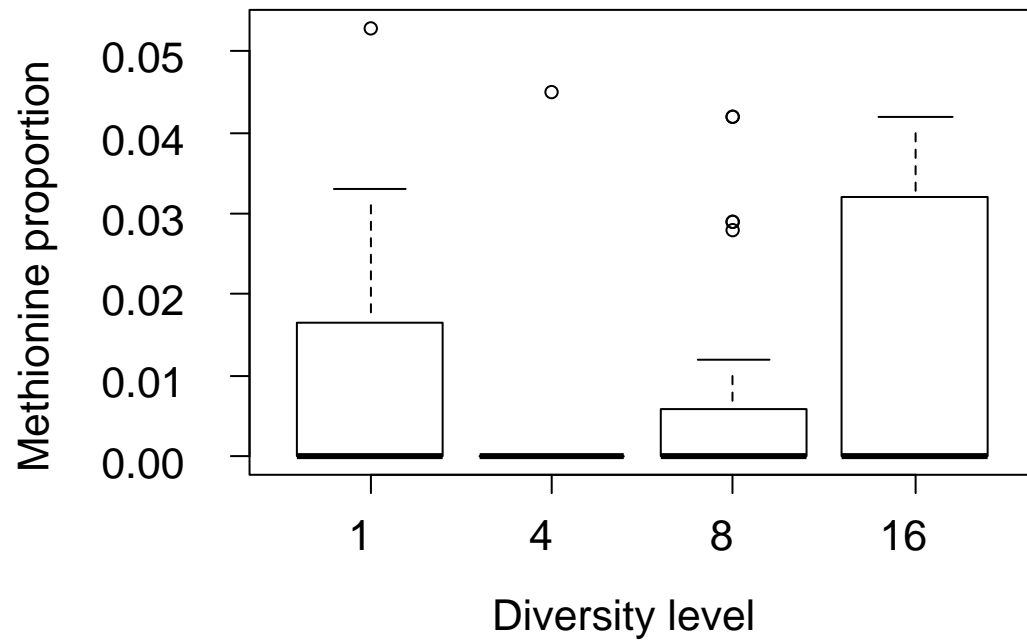


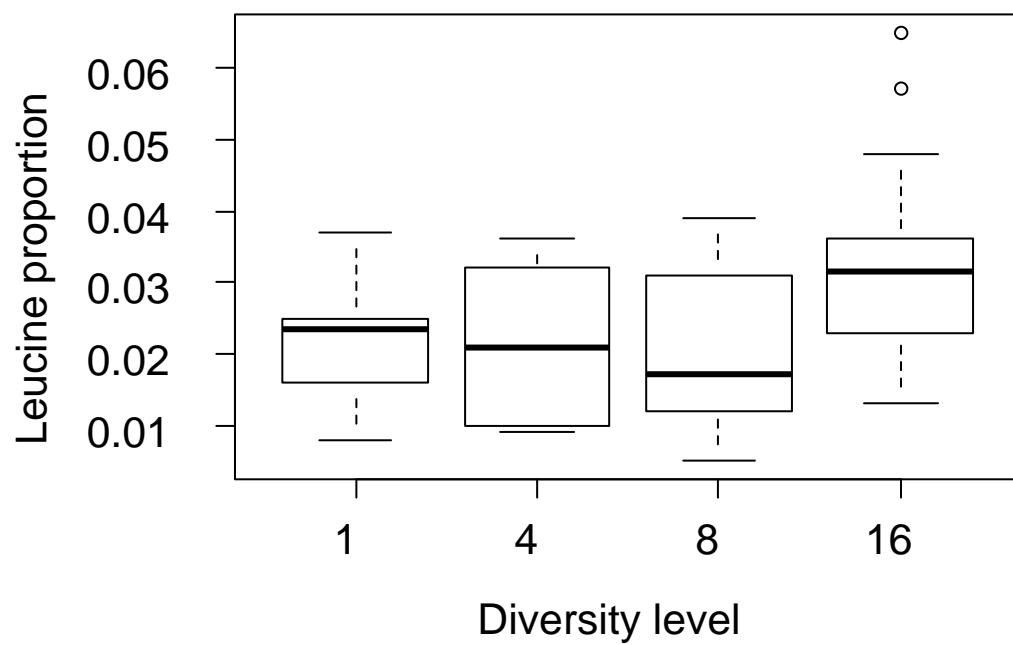
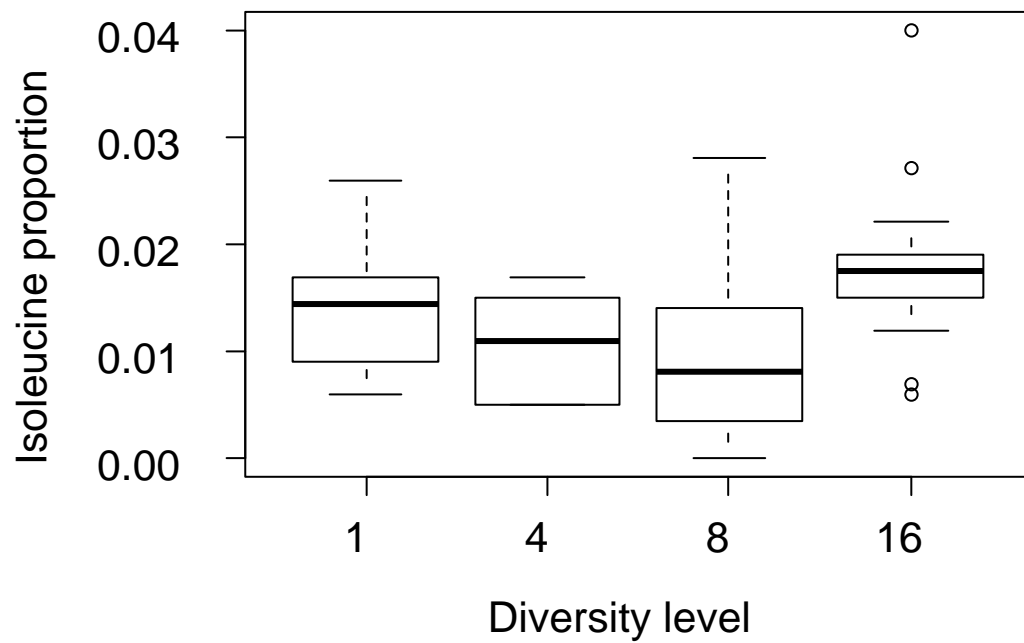


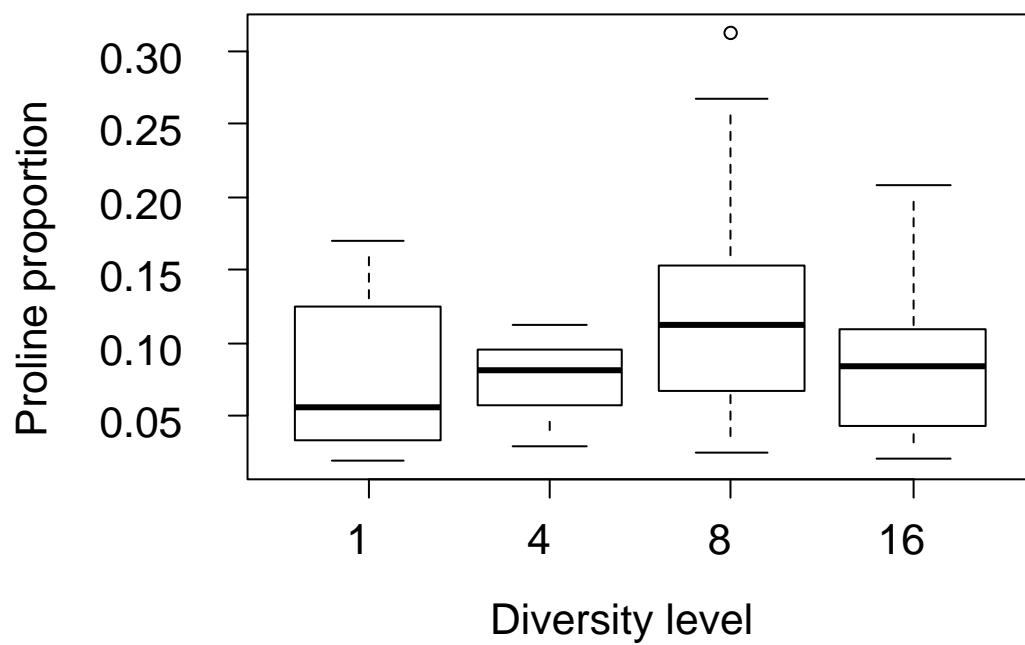
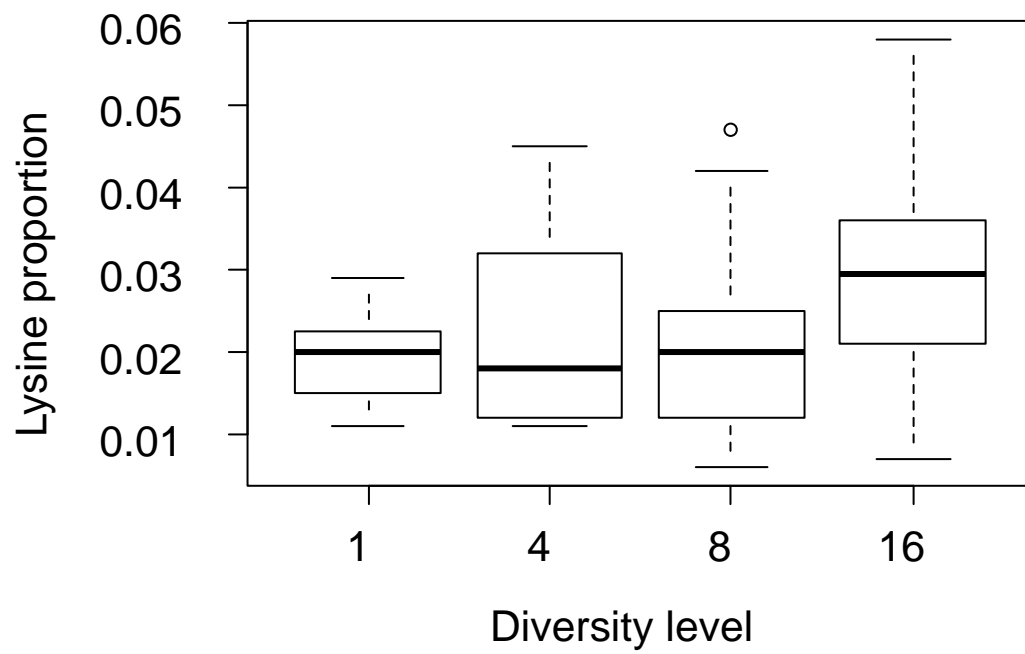


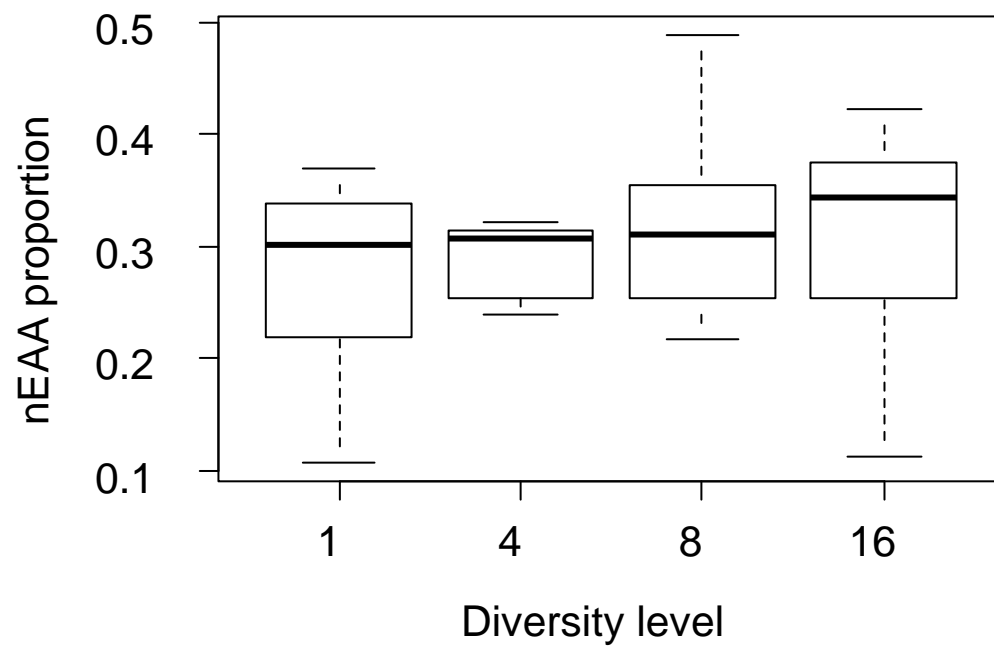
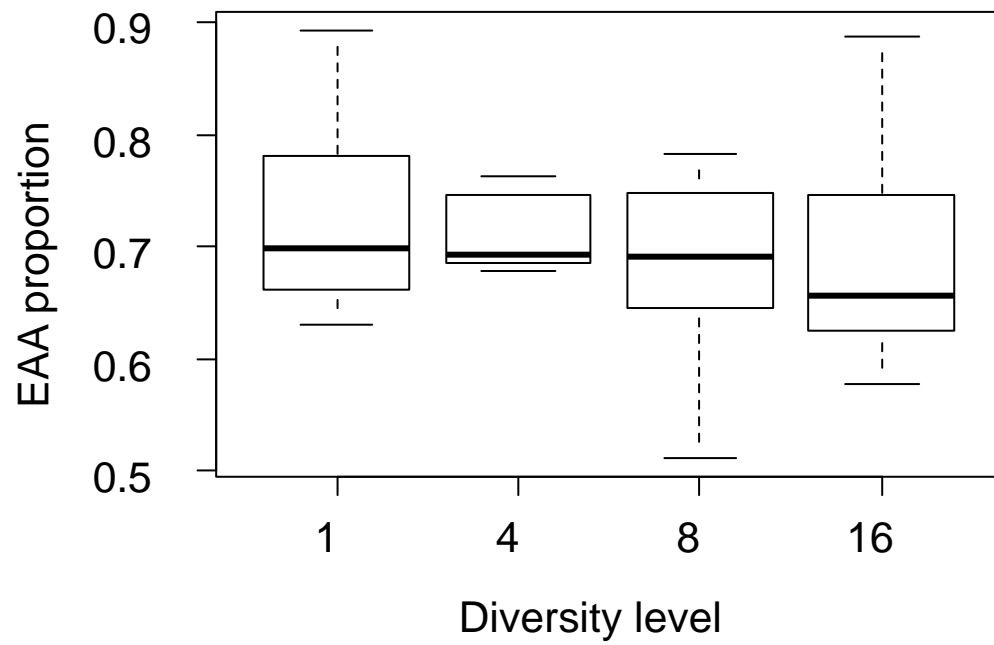


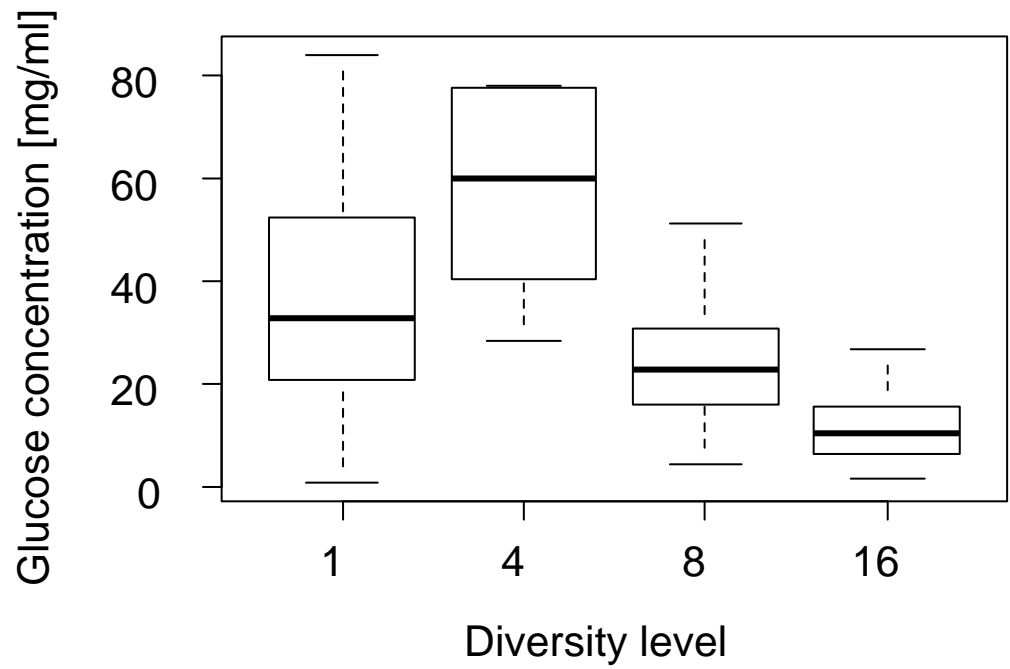
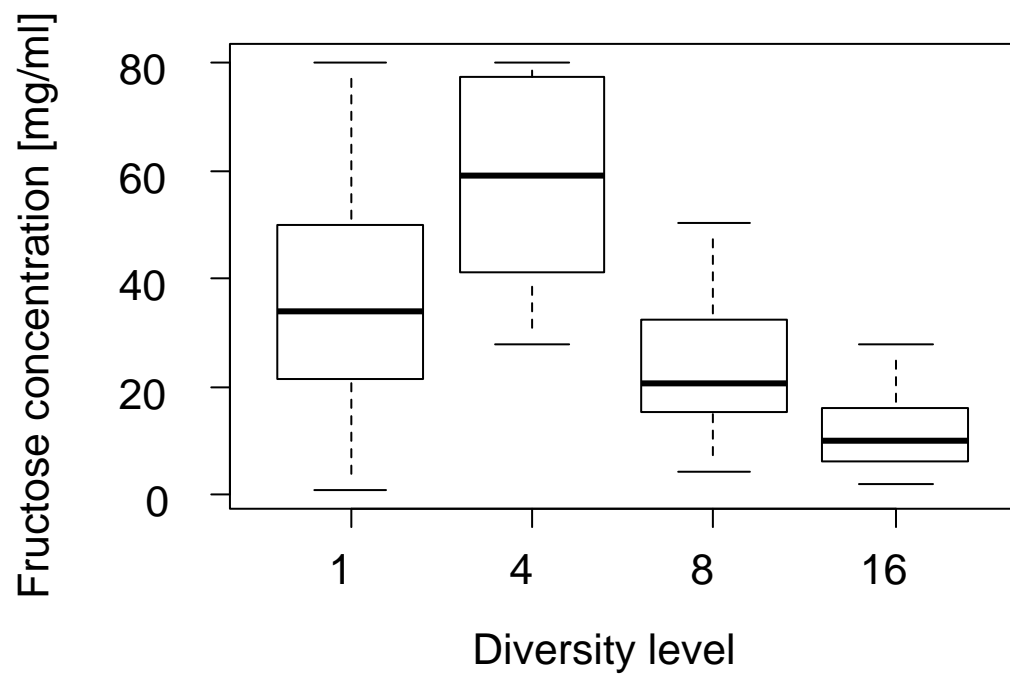


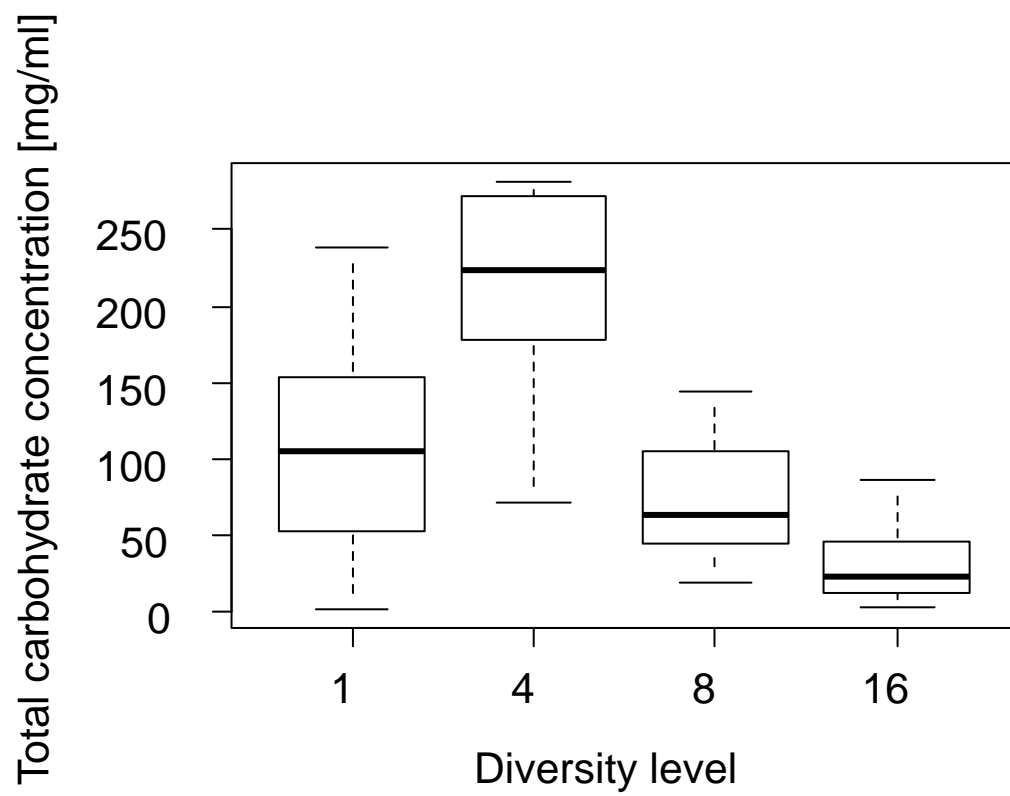
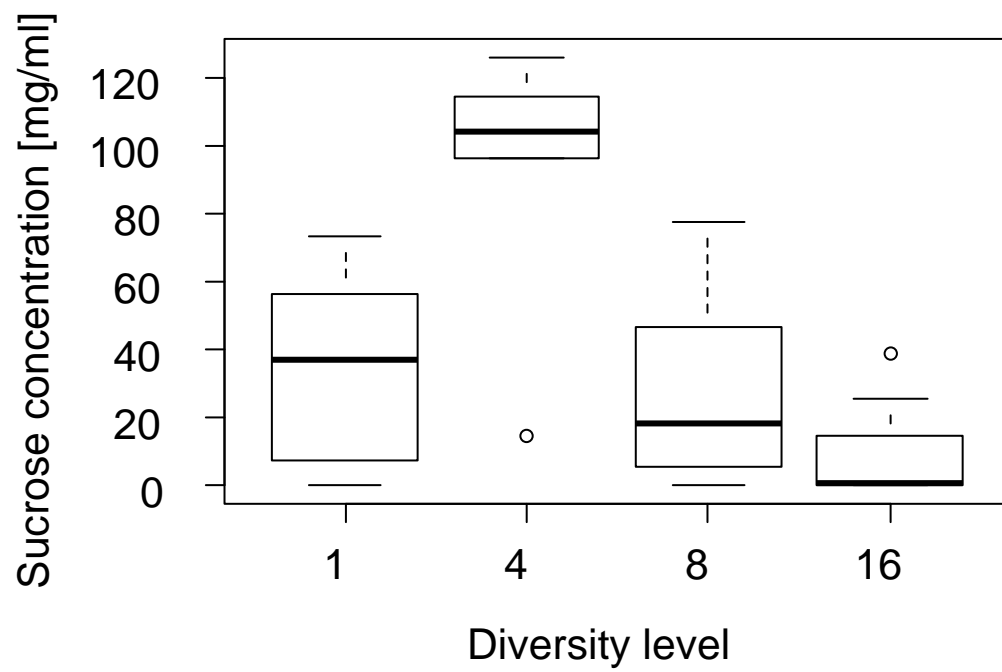


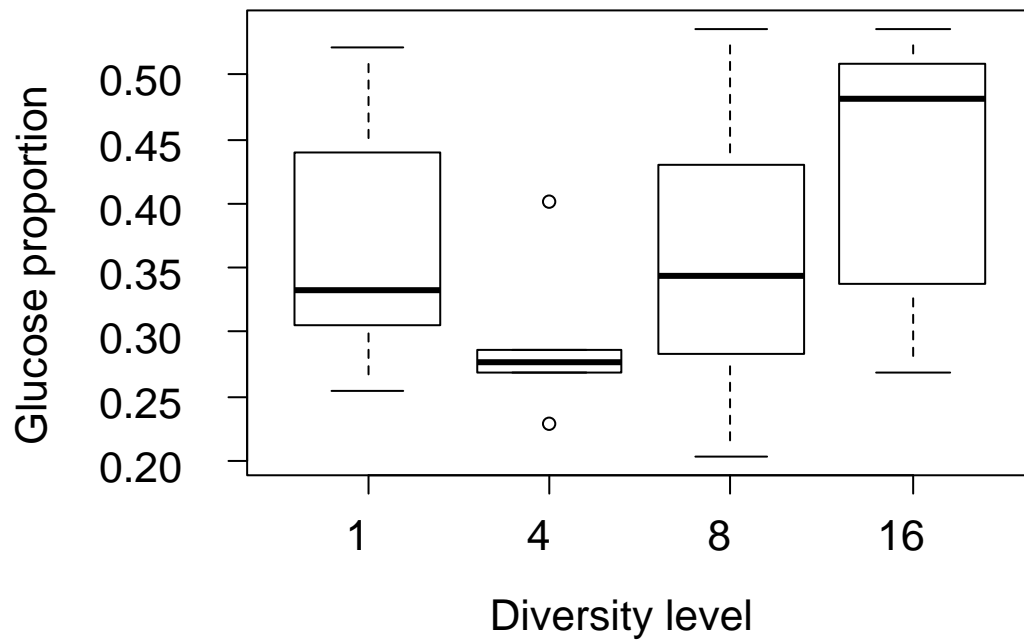
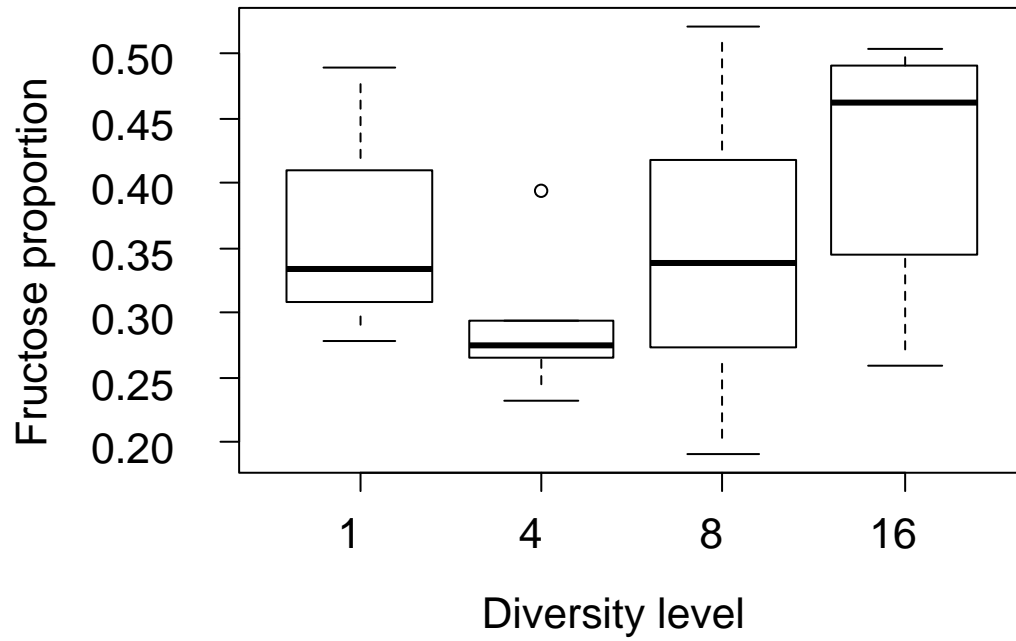


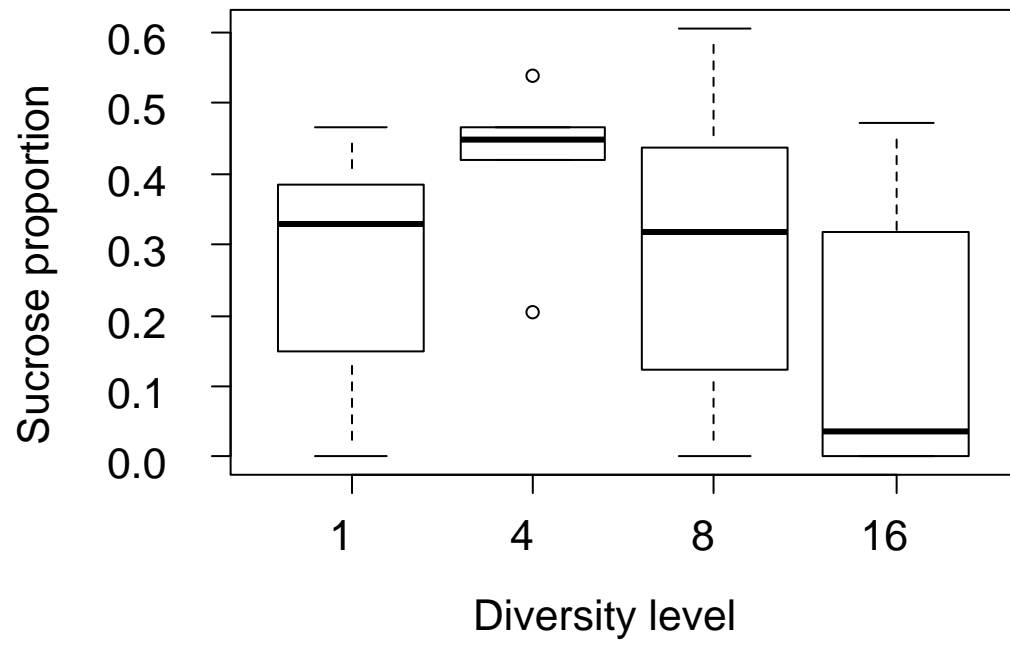












References

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