forests

Supplementary: Taxonomic and Functional Diversity of a *Quercus pyrenaica* Willd. Rhizospheric Microbiome in the Mediterranean Mountains

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a)

Site	Elevation	Type of area	Location
LAF	1482 masl	Oak forest	N 36°56'58", W 3°25'03"
HAF	1823 masl	Oak forest	N 36°57'44", W 3°25'09"
XZF	1945 masl	Oak isolated plants	N 36°57'56", W 3°25'45"

b)

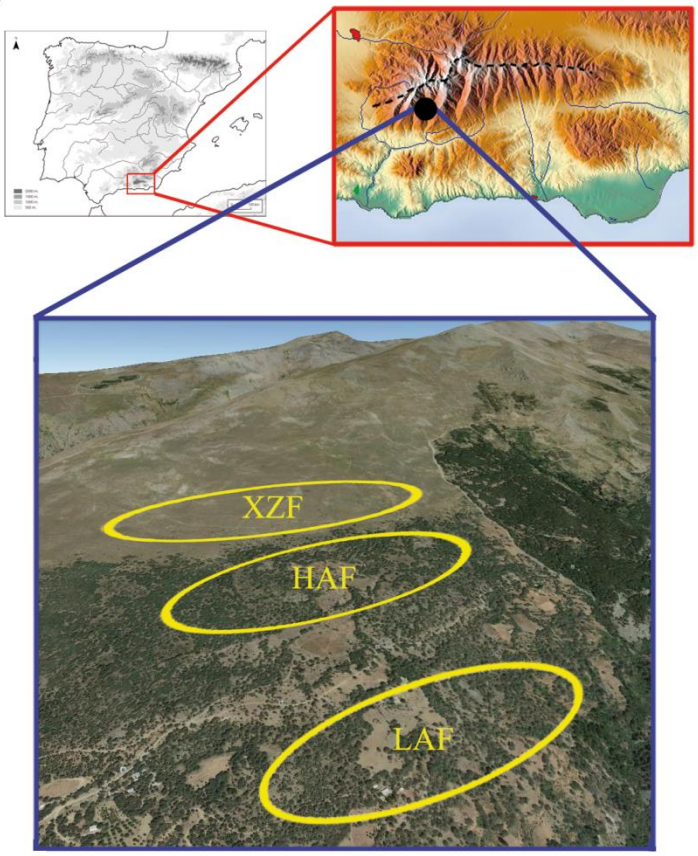

Figure S1. Description of the sampled areas. a) Location of study areas with its GPS position coordinates, altitude and kind of forest. b) Geographic location of the sampled sites at Sierra Nevada National Park.

LAF, low altitudinal oak forest; HAF, high altitudinal oak forest; XZF, expansion zone forest with padded shrub (*Genista versicolor*).

Table S1. Chemical and physical properties of soil under tree root influence at 5 – 25 cm depth within sampled areas of low altitudinal forest (LAF), high altitudinal forest (HAF) and expansion zone forest (XZF).

Parameter	LAF	HAF	XZF
Clay (%)	16.35	22.25	11.75
Sand (%)	63.50	44.25	62.44
Silt (%)	20.15	33.50	25.81
Type of soil	Sandy-Loam	Loam	Sandy-Loam
pH (H2O)	7.2	7.1	6.6
pH (ClK)	6.4	6.4	5.8
Available water (%)	11.10	16.52	10.39
Salinity (mmhos/cm3)	0.12	0.16	0.07
Organic matter (%)	3.88	6.07	3.82
Total N (%)	0.206	0.301	0.279
C/N ratio	10.82	11.59	7.87
Assimilable phosphorus (mg/kg)	4	27	20
Assimilable potassium (mg/kg)	205	365	205
Sodium (mg/kg)	0.052	0.610	0.043
Magnesium (mg/kg)	1.933	2.508	1.283
Calcium (%)	8.748	12.939	6.942

Determination of soil parameters.

Texture of soil samples was measured by Bouyoucos hydrometer method (Bouyoucos, 1962). Potentiometric method (Willard et al., 1974; Bates, 1983) was used for the determination of pH. Available water measurement was carried out by gravimetry after drying at a maximum temperature of 105 °C (Gardner, 1986). The method of electrical conductivity was used for determine the salinity. Quantification of total organic carbon was made by volumetric techniques with wet oxidation at controlled temperature (Mebius, 1960). Total nitrogen determination was performed with the Kjeldahl method (Bremner, 1965).Soluble P was measured by Bray method (Bray and Kurtz, 1945), and quantification is performed by colorimetry. Determination exchangeable bases soil was made by spectrometry using ammonium acetate.

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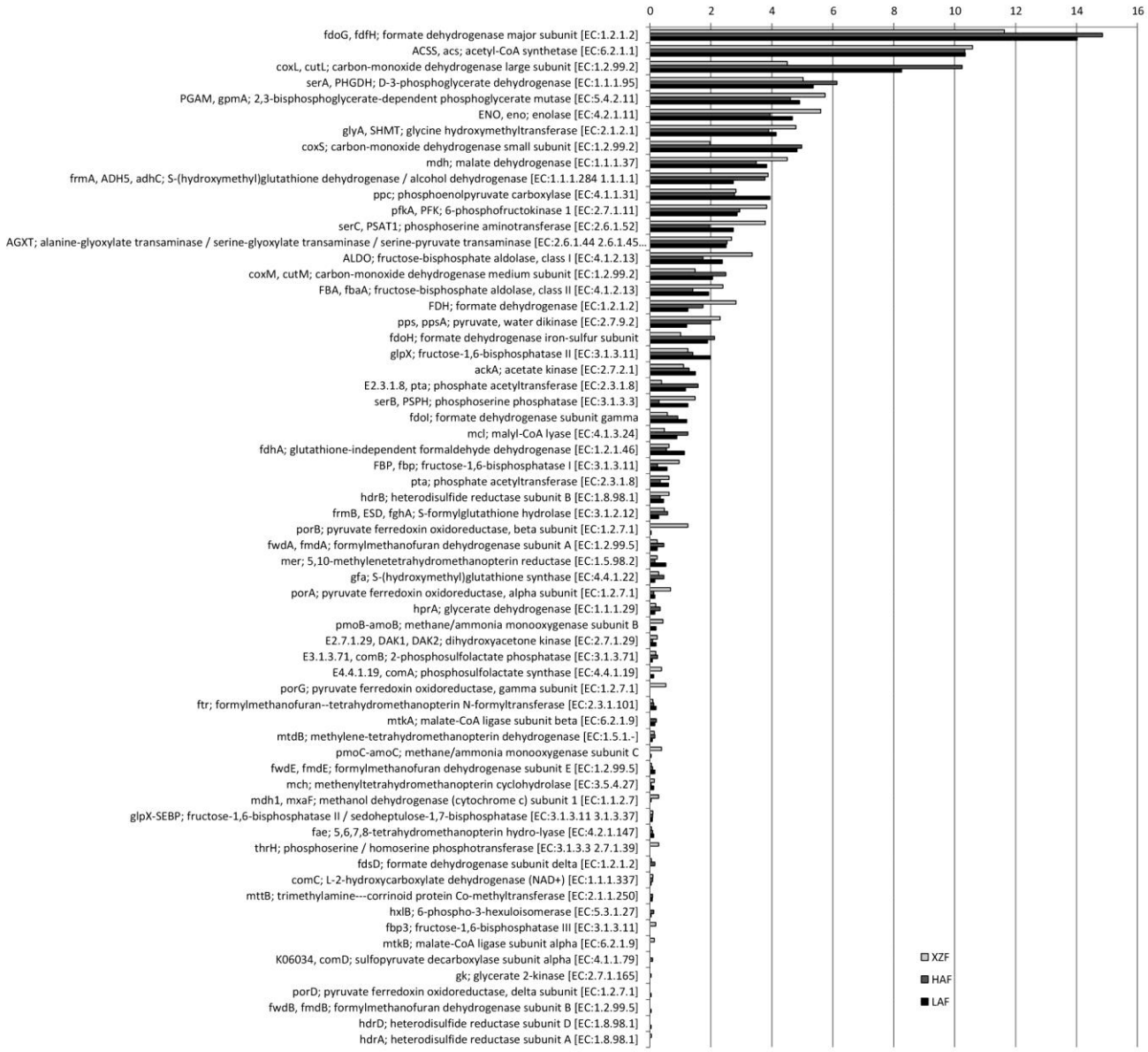

Figure S2. Relative abundance of the 64 protein sequences obtained for methane metabolism using BLASTX against the IMG genome database of IMG/JGI web server with a cut-off e-value of 1e-10.

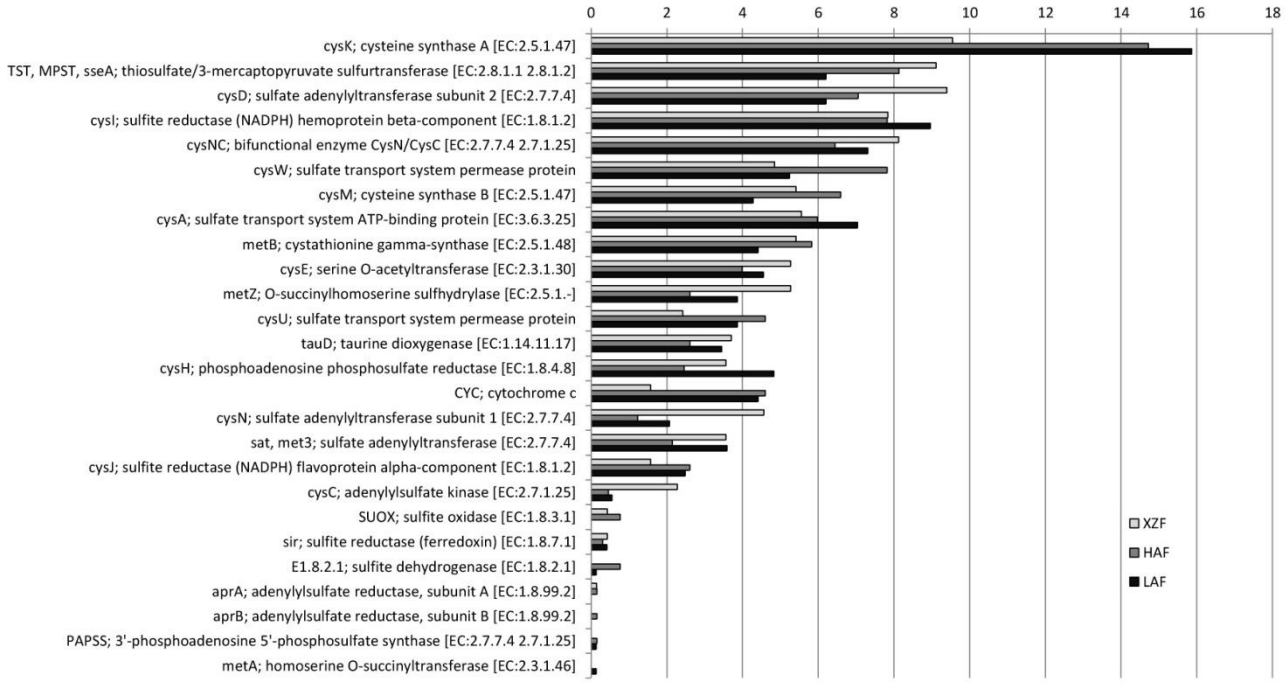

Figure S3. Relative abundance of the 26 protein sequences obtained for sulfur metabolism using BLASTX against the IMG genome database of IMG/JGI web server with a cut-off e-value of 1e-10.

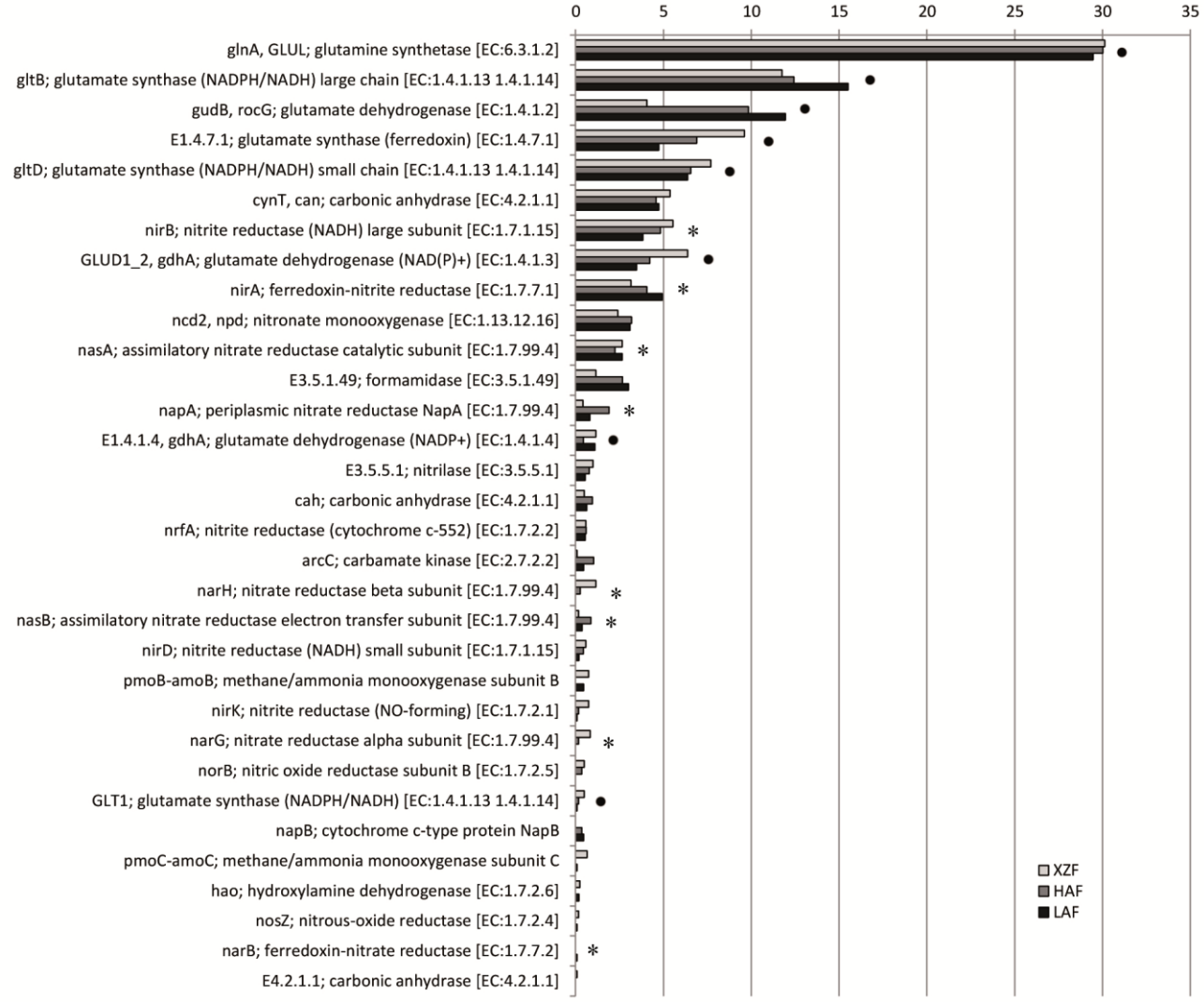

Figure S4. Relative abundance of the 32 protein sequences obtained for nitrogen metabolism using BLASTX against the IMG genome database of IMG/JGI web server with a cut-off e-value of 1e-10. Protein genes involved in nitrate assimilation are marked with asterisk, and those involved in ammonification or ammonia assimilation are marked with points.