# Supplementary material

# Long-term and short-term responses of land snail diversity after wildfire and salvage logging

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# Figure S1

## Snail diversity hypothesis

Hypothetical presentation of the three possible alternative trends by land snail diversity after fire and post-fire salvage logging treatments, where: (a) diversity has generally decreased over time since fire (probably due to general factors), (b) in some post-fire treatments diversity has improved while in others it has not, and (c) diversity has improved in all cases regardless of post-fire treatments. Graph treatments names does not correspond to names described on main text.



# Figure S2

## Location and situation of sampling plots

Location of Sant Llorenç del Munt I l’Obac Natural Park (PNSLL) in Catalonia and the situation of sampling stations in 2003-burnt area (grey) in the function of the treatment practised: non-management (NM), trunk removal (TR), complete removal (CR), subsoiling (SU), and recurrent fires (RF). Orange line corresponds to Natural Park limits.



# Figure S3

## Principal component analysis of habitat structure

Principal component analysis (PCA) of seven vegetation covers where the first component (PC1; percentage of explained variance= 34.49) corresponds to the plant cover and the second component (PC2; percentage of explained variance= 24.41) corresponds to the plant succession, from sprouts to resprouting species. The bottom table shows the percentage of contribution of the variables (if a factor has a low value, then it has a low contribution to explaining the variance of the variables).

|  |  |  |
| --- | --- | --- |
| **Importance of components** | **PC1**  | **PC2**  |
| **Standard deviation**  | 1.5537  | 1.3072  |
| **Proportion of Variance**  | 0.3449  | 0.2441  |
| **Cumulative Proportion**  | 0.3449  | 0.5889  |



# Table S1

## Non-metric multidimensional scaling (NMDS) vectors and factors

Non-metric multidimensional scaling (NMDS) vectors and factors eigenvectors for the two axes, the r2 and the significance (p-value) of the vector and factor on NMDS analysis.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Type of variables** | **Variable group** | **Variable** | **NMDS1**  | **NMDS2**  | **r2**  | **P value** |
| Vectors | Habitat structure | Oak  | 0.98 | 0.19 | 0.33 | 0.001 |
| Pine  | 0.99 | -0.13 | 0.15 | 0.01 |
| Grey-leaved cistus | -0.96  | -0.28 | 0.23 | 0.002 |
| Rosemary | 0.99  | 0.14 | 0.13 | 0.02 |
| Other shrubs  | 0.98 | 0.19 | 0.02 | 0.51  |
| Herb  | -0.28  | 0.96 | 0.01 | 0.73  |
| Bare ground | -0.96 | 0.27 | 0.07  | 0.15  |
| Wood debris shelter | Coarse woody debris (CWD) | 0.97  | -0.25  | 0.22 | 0.002 |
| Fine wood debris (FWD) | 0.92 | 0.38 | 0.02 | 0.61  |
| Rocky shelters | Rocky land  | -0.92 | -0.38 | 0.06 | 0.16  |
| Stones  | 0.99 | 0.06 | 0.28 | 0.001 |
| Litter shelter | Leaf litter  | 0.99 | 0.12 | 0.61  | 0.001 |
| Factors | Time since fire | Large  | 0.61 | 0.03 | 0.44 | 0.001 |
| Short  | -0.65 | -0.03 |
| Treatment | Non-management | 0.004  | -0.03 | 0.01 | 0.98  |
| Trunk removal | 0.06 | -0.02 |
| Complete removal  | -0.08 | -0.02 |
| Subsoiling | -0.12 | 0.21 |
| Recurrent fire | 0.02 | -0.08 |

# Table S2

## Number and preferences of land snail species and individuals.

The total number of alive snail species and individuals are shown separately by the period of sampling: short and long term after fire. Moisture preferences correspond to (X) xerophilous and (M) mesophilous species, while shelter preferences correspond to (S) stones (walls and stones), (HV) herbaceous vegetation (SV) shrub vegetation and (H) humus (fallen leaves, humus, and dead trunks). Dead individuals are not counted due to the incapacity to determine whether they died before, during or after fire.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Species** | **Short term after fire** | **Long term after fire** | **Moisture** | **Shelter**  |
| ***Abida cylindrica*** | 0 | 2 | M | S |
| ***Abida polyodon*** | 3 | 7 | M | S |
| ***Acanthinula aculeata*** | 0 | 10 | M | H |
| ***Aegopinella* spp.** | 0 | 2 | M | H |
| ***Cepaea nemoralis*** | 2 | 13 | M | H |
| ***Cernuella virgata*** | 245 | 0 | X | HV |
| ***Cornu aspersum*** | 35 | 1 | M | HV |
| ***Discus rotundatus*** | 0 | 2 | M | H |
| ***Euconulus* spp.** | 0 | 12 | M | H |
| ***Ferussacia folliculum*** | 5 | 15 | X | SV |
| ***Graniberia braunii*** | 1 | 0 | X | S |
| ***Granopupa granum*** | 2 | 12 | X | S |
| ***Helicigona lapicida*** | 1 | 0 | M | S |
| ***Jaminia quadridens*** | 0 | 7 | X | S |
| ***Monacha cartusiana*** | 2 | 2 | X | HV |
| ***Montserratina bofilliana*** | 1 | 1 | M | S |
| ***Otala punctata*** | 1 | 0 | X | SV |
| ***Oxychilus courquini*** | 2 | 7 | X | S |
| ***Oxychilus draparnaudi*** | 4 | 5 | M | H |
| ***Paralaoma servilis*** | 0 | 16 | M | H |
| ***Pomatias elegans*** | 3 | 29 | M | H |
| ***Pseudotachea splendida*** | 2 | 22 | X | SV |
| ***Punctum pygmaeum*** | 0 | 7 | M | H |
| ***Rumina decollata*** | 1 | 0 | X | H |
| ***Truncatellina callicratis*** | 0 | 37 | M | H |
| ***Vallonia costata*** | 0 | 25 | M | S |
| ***Vitrea* spp.** | 0 | 44 | M | H |
| ***Xerocrassa montserratensis*** | 50 | 0 | X | S |
| ***Xerocrassa penchinati*** | 269 | 19 | X | S |
| ***Xerosecta cespitum arigonis*** | 7 | 0 | X | HV |

# Table S3

## **Selected GLMM models and criteria**

Models structure for acorn removal response variable selected following criteria of greater AIC weight (ωi). If there was no clearly most parsimonious model than the rest, we proceeded to estimate the average final model, from all those models considered with an adjustment equivalent to the best model, (ΔAICci less than 2). Red models correspond to discarded ones for having the null model (without any variable) as the best model or within the best models.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Response variable** | **Model** | **df** | **AICc** | **ΔAICci** | **ωi** |
| **Snail community** | **Abundance** | Rocky land | 4 | -33.7 | 0.00 | 0.86 |
| Rocky land + Plant succession | 5 | -28.1 | 5.67 | 0.05 |
| **α-diversity** | Leaf litter + Plant succession | 5 | 257.5 | 0.00 | 0.21 |
| Leaf litter + Plant succession + CWD | 6 | 259.8 | 2.29 | 0.07 |
| **β-diversity** | Leaf litter + Plant succession + stones | 6 | 449.97 | 0.00 | 0.16 |
| Leaf litter + Plant succession | 5 | 450.45 | 0.48 | 0.12 |
| Leaf litter + Plant succession + plant cover +stones | 7 | 450.97 | 0.99 | 0.10 |
| plant cover | 4 | 451.18 | 1.21 | 0.09 |
| Leaf litter + Plant succession + rocky land + stones | 7 | 451.37 | 1.40 | 0.08 |
| Leaf litter + Plant succession + plant cover | 6 | 451.37 | 1.40 | 0.08 |
| Plant succession + plant cover + stones | 6 | 451.39 | 1.42 | 0.07 |
| Plant succession + plant cover | 5 | 451.57 | 1.60 | 0.07 |
| Leaf litter + Plant succession + rocky land | 6 | 451.60 | 1.63 | 0.06 |
| plant cover + rocky land | 5 | 451.70 | 1.73 | 0.06 |
| plant cover + stones | 5 | 451.88 | 1.91 | 0.06 |
| Rocky land  | 4 | 451.89 | 1.92 | 0.06 |
| **Common snails** | **Abundance** | Rocky land  | 4 | -36.2 | 0.00 | 0.83 |
| Rocky land + Plant succession | 5 | -31.2 | 5.00 | 0.07 |
| **α-diversity** | Leaf litter + Plant succession  | 5 | 213.69 | 0.00 | 0.48 |
| (Null)  | 3 | 214.52 | 0.83 | 0.32 |
| Plant succession  | 4 | 215.47 | 1.78 | 0.20 |
| **β-diversity** | Plant succession | 4 | 347.70 | 0.00 | 0.36 |
| Plant succession + plant cover | 5 | 348.93 | 1.24 | 0.19 |
| Plant succession + stones | 5 | 349.11 | 1.41 | 0.18 |
| Stones  | 4 | 349.46 | 1.77 | 0.15 |
| plant cover + stones | 5 | 349.69 | 1.99 | 0.13 |
| **Xerophilous snails** | **Abundance** | Rocky land  | 4 | -35.3 | 0.00 | 0.63 |
| Rocky land + stones | 5 | -32.3 | 2.99 | 0.14 |
| **α-diversity** | Leaf litter | 4 | 198.10 | 0.00 | 0.21 |
| Leaf litter + plant cover | 5 | 198.30 | 0.20 | 0.19 |
| Plant succession + Leaf litter | 5 | 198.75 | 0.65 | 0.15 |
| plant cover + stones | 5 | 199.62 | 1.52 | 0.10 |
| Leaf litter + CWD | 5 | 199.84 | 1.74 | 0.09 |
| Leaf litter + stones | 5 | 199.89 | 1.79 | 0.09 |
| Plant succession + Leaf litter + stones | 6 | 199.98 | 1.88 | 0.08 |
| Plant succession + Leaf litter + plant cover | 6 | 200.04 | 1.94 | 0.08 |
| **β-diversity** | Stones  | 4 | 352.23 | 0.00 | 0.40 |
| Stones + CWD | 5 | 353.23 | 1.01 | 0.24 |
| Plant cover + stones  | 5 | 353.75 | 1.53 | 0.19 |
| Plant succession + stones  | 5 | 353.94 | 1.72 | 0.17 |
| **Mesophilous snails** | **Abundance** | Leaf litter | 4 | -163.3 | 0.00 | 0.53 |
| Leaf litter + Plant succession | 5 | -163.1 | 0.21 | 0.47 |
| **α-diversity** | Leaf litter + Plant succession + stones + CWD | 7 | 195.83 | 0.00 | 0.45 |
| Leaf litter + Plant succession + stones | 6 | 196.68 | 0.85 | 0.30 |
| Leaf litter + Plant succession + rocky land + stones + CWD | 8 | 197.01 | 1.18 | 0.25 |
| **β-diversity** | Leaf litter + Plant succession + stones | 6 | 375.73 | 0.00 | 0.48 |
| Leaf litter + Plant succession | 5 | 376.36 | 0.64 | 0.35 |
| Leaf litter + Plant succession + plant cover + stones | 7 | 377.72 | 1.99 | 0.18 |
| **Stone snails** | **Abundance** | Stones | 4 | -133.4 | 0.00 | 0.838 |
| Plant succession | 4 | -128.5 | 4.94 | 0.071 |
| **α-diversity** | Leaf litter  | 4 | 175.67 | 0.00 | 0.15 |
| CWD | 4 | 176.36 | 0.69 | 0.11 |
| (Null)  | 3 | 176.64 | 0.97 | 0.09 |
| FWD + stones  | 5 | 176.82 | 1.15 | 0.09 |
| [...] |  |  |  |  |
| **β-diversity** | (Null)  | 3 | 326.72 | 0.00 | 0.44 |
| Plant succession | 4 | 328.01 | 1.29 | 0.23 |
| Plant cover | 4 | 328.61 | 1.89 | 0.17 |
| Stones  | 4 | 328.69 | 1.97 | 0.16 |
| **Herb snails** | **Abundance** | Rocky land  | 4 | -43.2 | 0.00 | 0.928 |
| Plant succession + rocky land  | 5 | -35.7 | 7.47 | 0.022 |
| **α-diversity** | Leaf litter | 4 | 105.51 | 0.00 | 0.29 |
| Plant succession | 4 | 105.94 | 0.43 | 0.24 |
| Leaf litter + Plant succession | 5 | 106.43 | 0.91 | 0.19 |
| FWD + leaf litter | 5 | 106.83 | 1.32 | 0.15 |
| FWD + Plant succession | 5 | 107.05 | 1.53 | 0.14 |
| **β-diversity** | Plant succession  | 4 | 183.2 | 0.00 | 0.56 |
| Plant succession + stones  | 5 | 187.9 | 4.72 | 0.13 |
| **Shrub snails** | **Abundance** | (Null)  | 3 | -320.2 | 0.00 | 0.98 |
| Plant succession | 4 | -311.3 | 8.93 | 0.01 |
| **α-diversity** | Plant succession | 4 | 88.00 | 0.00 | 0.38 |
| Plant succession + CWD | 5 | 89.02 | 1.03 | 0.23 |
| Leaf litter | 4 | 89.17 | 1.17 | 0.21 |
| Plant succession + rocky land  | 5 | 89.59 | 1.59 | 0.17 |
| **β-diversity** | Plant succession | 4 | 105.69 | 0.00 | 0.55 |
| (Null)  | 3 | 106.13 | 0.44 | 0.45 |
| **Hummus snails** | **Abundance** | leaf litter | 4 | -211.3 | 0.00 | 0.875 |
| leaf litter + Plant succession | 5 | -206.9 | 4.35 | 0.099 |
| **α-diversity** | Leaf litter + Plant succession + stones + CWD | 7 | 171.69 | 0.00 | 0.26 |
| Leaf litter + Plant succession + CWD | 6 | 171.73 | 0.04 | 0.25 |
| Leaf litter + Plant succession | 5 | 172.76 | 1.08 | 0.15 |
| Leaf litter + Plant succession + stones | 6 | 173.20 | 1.52 | 0.12 |
| Leaf litter + Plant succession + rocky land + stones + CWD | 8 | 173.20 | 1.52 | 0.12 |
| Leaf litter + Plant succession + rocky land + CWD | 7 | 173.65 | 1.96 | 0.10 |
| **β-diversity** | Leaf litter + Plant succession  | 5 | 327.1 | 0.00 | 0.45 |
| Leaf litter + Plant succession + stones  | 6 | 329.6 | 2.53 | 0.13 |
| **Conservation aspects** | **Threatened snails** | Plant succession | 4 | 66.74 | 0.00 | 0.30 |
| Plant succession + CWD | 5 | 67.06 | 0.32 | 0.26 |
| FWD + Plant succession | 5 | 67.35 | 0.61 | 0.22 |
| FWD + Plant succession + CWD | 6 | 68.67 | 1.93 | 0.11 |
| Leaf litter + Plant succession | 5 | 68.73 | 1.99 | 0.11 |
| **Endemism snails** | CWD | 4 | 99.92 | 0.00 | 0.14 |
| FWD + Plant succession | 5 | 100.60 | 0.68 | 0.10 |
| FWD | 4 | 100.63 | 0.72 | 0.10 |
| FWD + stones | 5 | 100.77 | 0.85 | 0.09 |
| FWD + CWD | 5 | 100.80 | 0.88 | 0.09 |
| Plant succession + CWD | 5 | 100.96 | 1.05 | 0.08 |
| FWD + leaf litter | 5 | 101.32 | 1.40 | 0.07 |
| Plant succession | 4 | 101.47 | 1.55 | 0.06 |
| Stones + CWD | 5 | 101.75 | 1.83 | 0.06 |
| FWD + stones + CWD | 6 | 101.77 | 1.86 | 0.05 |
| FWD + Plant succession + CWD | 6 | 101.82 | 1.90 | 0.05 |
| Leaf litter + CWD | 5 | 101.82 | 1.91 | 0.05 |
| Rocky land + CWD | 5 | 101.87 | 1.95 | 0.05 |
| ***Cepaea nemoralis*** | Leaf litter + Plant succession | 5 | 74.72 | 0.00 | 0.25 |
| Leaf litter | 4 | 75.09 | 0.37 | 0.21 |
| FWD + Leaf litter + Plant succession | 6 | 75.87 | 1.14 | 0.14 |
| Leaf litter + plant cover | 5 | 75.95 | 1.22 | 0.14 |
| Leaf litter + Plant succession + CWD | 6 | 75.99 | 1.27 | 0.13 |
| plant cover + CWD | 5 | 76.24 | 1.52 | 0.12 |
| ***Cernuella virgata*** | Leaf litter  | 4 | 129.27 | 0.00 | 0.45 |
| Leaf litter + rocky land  | 5 | 129.59 | 0.32 | 0.38 |
| Leaf litter + plant cover  | 5 | 131.16 | 1.89 | 0.17 |
| ***Cornu aspersum*** | Leaf litter + plant cover | 5 | 104.39 | 0.00 | 0.15 |
| Leaf litter + Plant succession | 5 | 105.21 | 0.82 | 0.10 |
| Leaf litter + stones | 5 | 105.24 | 0.85 | 0.10 |
| Plant succession | 4 | 105.26 | 0.87 | 0.10 |
| Plant succession + CWD | 5 | 105.64 | 1.25 | 0.08 |
| Leaf litter | 4 | 105.67 | 1.28 | 0.08 |
| Leaf litter + rocky land + stones | 6 | 105.72 | 1.34 | 0.08 |
| Leaf litter + plant cover + rocky land | 6 | 105.91 | 1.52 | 0.07 |
| Leaf litter + Plant succession + stones | 6 | 106.20 | 1.81 | 0.06 |
| Leaf litter + Plant succession + plant cover | 6 | 106.27 | 1.88 | 0.06 |
| Leaf litter + plant cover + stones | 6 | 106.31 | 1.92 | 0.06 |
| FWD + Leaf litter + stones | 6 | 106.39 | 2.00 | 0.06 |
| ***Ferussacia folliculum*** | Plant succession + rocky land | 5 | 62.87 | 0.00 | 0.14 |
| FWD + Plant succession  | 5 | 63.18 | 0.32 | 0.12 |
| FWD + Plant succession + rocky land | 6 | 63.19 | 0.33 | 0.11 |
| FWD + Plant succession + stones | 6 | 63.57 | 0.71 | 0.10 |
| Plant succession + rocky land + stones | 6 | 63.60 | 0.73 | 0.09 |
| Plant succession | 4 | 63.81 | 0.95 | 0.08 |
| Plant succession + stones | 5 | 63.94 | 1.07 | 0.08 |
| Leaf litter | 4 | 64.06 | 1.19 | 0.07 |
| Leaf litter + plant cover | 5 | 64.17 | 1.31 | 0.07 |
| FWD + Plant succession + rocky land + stones | 7 | 64.20 | 1.33 | 0.07 |
| Leaf litter + stones | 5 | 64.27 | 1.40 | 0.07 |
| ***Granopupa granum*** | Plant succession + CWD | 5 | 72.02 | 0.00 | 0.21 |
| Leaf litter + Plant succession + CWD | 6 | 72.10 | 0.09 | 0.20 |
| FWD + Leaf litter + Plant succession + CWD | 7 | 73.28 | 1.26 | 0.11 |
| FWD + Plant succession + CWD | 6 | 73.42 | 1.40 | 0.10 |
| Plant succession + rocky land + CWD | 6 | 73.43 | 1.41 | 0.10 |
| Plant succession + stones + CWD | 6 | 73.64 | 1.62 | 0.09 |
| Leaf litter + Plant succession + rocky land + CWD | 7 | 73.69 | 1.67 | 0.09 |
| Leaf litter + Plant succession + plant cover + CWD | 7 | 73.87 | 1.85 | 0.08 |
| ***Oxychilus courquini*** | plant cover | 4 | 50.42 | 0.00 | 0.52 |
| FWD + plant cover | 5 | 51.93 | 1.51 | 0.25 |
| Plant succession + plant cover | 5 | 52.05 | 1.63 | 0.23 |
| ***Oxychilus draparnaudi*** | **(Null)**  | **3** | **60.39** | **0.00** | **0.32** |
| plant cover | 4 | 60.64 | 0.25 | 0.28 |
| Leaf litter | 4 | 62.03 | 1.64 | 0.14 |
| Leaf litter + Plant succession  | 5 | 62.05 | 1.66 | 0.14 |
| CWD | 4 | 62.19 | 1.80 | 0.13 |
| ***Paralaoma servilis*** | stones | 4 | 65.09 | 0.00 | 0.28 |
| stones + CWD | 5 | 65.57 | 0.48 | 0.22 |
| Leaf litter | 4 | 66.26 | 1.17 | 0.15 |
| Leaf litter + stones | 5 | 66.71 | 1.62 | 0.12 |
| Leaf litter + CWD | 5 | 66.87 | 1.79 | 0.11 |
| Plant succession + CWD | 5 | 66.91 | 1.83 | 0.11 |
| ***Pomatias elegans*** | Leaf litter | 4 | 121.33 | 0.00 | 0.22 |
| Plant succession + plant cover | 5 | 121.48 | 0.15 | 0.21 |
| FWD + Plant succession + plant cover | 6 | 122.25 | 0.92 | 0.14 |
| Leaf litter + plant cover | 5 | 122.32 | 0.99 | 0.14 |
| FWD + Leaf litter | 5 | 122.78 | 1.45 | 0.11 |
| FWD + Leaf litter + plant cover | 6 | 122.79 | 1.46 | 0.11 |
| Leaf litter + rocky land | 5 | 123.29 | 1.96 | 0.08 |
| ***Pseudotachea splendida*** | Leaf litter + CWD | 5 | 95.91 | 0.00 | 0.24 |
| Plant succession + CWD  | 5 | 96.31 | 0.40 | 0.19 |
| CWD | 4 | 96.46 | 0.55 | 0.18 |
| Leaf litter + plant cover + CWD  | 6 | 96.71 | 0.80 | 0.16 |
| FWD + Leaf litter + CWD | 6 | 97.06 | 1.15 | 0.13 |
| stones + CWD | 5 | 97.55 | 1.64 | 0.10 |
| ***Truncatellina callicratis*** | Plant succession + stones | 5 | 108.91 | 0.00 | 0.17 |
| Leaf litter + stones | 5 | 109.27 | 0.36 | 0.14 |
| Leaf litter + plant cover + stones | 6 | 109.52 | 0.61 | 0.12 |
| Plant succession + stones + CWD | 6 | 109.79 | 0.88 | 0.11 |
| Leaf litter + Plant succession | 5 | 109.96 | 1.05 | 0.10 |
| Leaf litter + plant cover | 5 | 110.00 | 1.09 | 0.10 |
| Leaf litter | 4 | 110.05 | 1.14 | 0.09 |
| Leaf litter + Plant succession + stones | 6 | 110.22 | 1.31 | 0.09 |
| Plant succession | 4 | 110.30 | 1.39 | 0.08 |
| ***Vitrea sp.*** | Leaf litter | 4 | 119.46 | 0.00 | 0.37 |
| Leaf litter + plant cover | 5 | 120.70 | 1.24 | 0.20 |
| Leaf litter + Plant succession | 5 | 121.18 | 1.72 | 0.16 |
| Leaf litter + stones | 5 | 121.43 | 1.97 | 0.14 |
| FWD + Leaf litter | 5 | 121.44 | 1.98 | 0.14 |
| ***Xerocrassa montserratensis*** | Plant succession + CWD | 5 | 102.03 | 0.00 | 0.39 |
| Plant succession + plant cover + CWD | 6 | 103.88 | 1.85 | 0.16 |
| FWD + Plant succession + CWD | 6 | 103.90 | 1.87 | 0.15 |
| Leaf litter + Plant succession + CWD | 6 | 103.94 | 1.91 | 0.15 |
| Leaf litter + Plant succession | 5 | 103.98 | 1.96 | 0.15 |
| ***Xerocrassa penchinati*** | Leaf litter + CWD | 5 | 293.91 | 0.00 | 0.31 |
| Plant succession + plant cover + CWD | 6 | 294.12 | 0.21 | 0.28 |
| Leaf litter + Plant succession + plant cover + CWD | 7 | 294.59 | 0.68 | 0.22 |
| Leaf litter + Plant succession + CWD | 6 | 294.89 | 0.98 | 0.19 |

# Figure S4

## Habitat structure changes through time since fire.

Percentage of (a) ground cover variation through the time since fire and (b) variation over the time since fire and the type of treatments of the shelter provided by wood debris cover and leaf litter, plant cover, plant succession and habitat diversity index.



# Table S4

## Effect of post-fire treatment on snail community.

Results from Generalized Linear Mixed Models (GLMMs) of the long-term effect of post-fire treatment on land snail community measures in the study area of the Sant Llorenç del Munt i l’Obac Natural Park (PNSLL). The table shows the model parameter coefficient (b) and its standard error (±SE). Intercept is the value of response variable in Complete removal treatment (CR) and a long time since fire, when all the covariates are = 0, while its p-value indicates whether it is significantly different from 0.

If the variable were significant (p-values <0.05) the parameters of the variable in question are shown in bold type.

sTSF corresponds to the short time since fire category. The treatment factors correspond to trunk removal (TR), complete removal (CR), trunk removal and subsoiling (SU) and recurrent fires (RF).

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Response variable** | **Intercept** | **sTSF** | **Treatment** | **TSF\*treatment** |
| **TR** | **CR** | **SU** | **RF** | **sTSF\*TR** | **sTSF\*CR** | **sTSF\*SU** | **sTSF\*RF** |
| **Snail community** | **Abundance** | 0.17 ± 0.08 | -0.05 ± 0.11 | -0.08 ± 0.1 | -0.09 ± 0.11 | -0.1 ± 0.12 | -0.1 ± 0.11 | 0.14 ± 0.13 | 0.31 ± 0.15 | 0.08 ± 0.16 | 0.25 ± 0.15 |
| **α-diversity** | **1.86 ± 0.21** | **-1.31 ± 0.42** | -0.45 ± 0.25 | -0.49 ± 0.31 | -0.69 ± 0.35 | **-0.84 ± 0.34** | 0.91 ± 0.47 | 0.71 ± 0.57 | 1.05 ± 0.59 | **1.51 ± 0.55** |
| **β-diversity** | 3.9 ± 4.46 | **13.84 ± 5.48** | 5.14 ± 5.11 | 7.04 ± 5.99 | 9.47 ± 6.31 | 12.95 ± 5.99 | -8.83 ± 6.26 | -7.29 ± 7.35 | -15.72 ± 7.75 | **-18.8 ± 7.35** |
| **Common snails** | **Abundance** | 0.12 ± 0.08 | 0.002 ± 0.11 | -0.05 ± 0.09 | -0.07 ± 0.11 | -0.07 ± 0.12 | -0.05 ± 0.11 | 0.1 ± 0.12 | 0.29 ± 0.14 | 0.05 ± 0.15 | 0.19 ± 0.14 |
| **α-diversity** | **1.18 ± 0.27** | -0.62 ± 0.44 | -0.28 ± 0.32 | -0.59 ± 0.42 | -0.62 ± 0.45 | -0.59 ± 0.43 | 0.55 ± 0.51 | 0.72 ± 0.62 | 0.75 ± 0.67 | 1.13 ± 0.61 |
| **β-diversity** | 3.1 ± 2.0 | 2.78 ± 2.83 | 2.55 ± 2.29 | 5.1 ± 2.69 | 4.4 ± 2.83 | 5.1 ± 2.69 | -3.3 ± 3.24 | -4.82 ± 3.8 | -5.77 ± 4.01 | -6.26 ± 3.8 |
| **Xerophilous snails** | **Abundance** | 0.03 ± 0.08 | 0.07 ± 0.11 | -0.007 ± 0.09 | -0.004 ± 0.11 | -0.01 ± 0.11 | -0.0005 ± 0.11 | 0.06 ± 0.12 | 0.25 ± 0.14 | 0.01 ± 0.15 | 0.15 ± 0.14 |
| **α-diversity** | 0.56 ± 0.36 | -0.15 ± 0.52 | -0.29 ± 0.42 | -0.56 ± 0.57 | -0.34 ± 0.57 | -0.09 ± 0.51 | 0.54 ± 0.6 | 0.94 ± 0.75 | 0.62 ± 0.77 | 0.47 ± 0.71 |
| **β-diversity** | **7.92 ± 2.06** | 0.83 ± 2.72 | 1.92 ± 2.36 | 2.75 ± 2.77 | 2.17 ± 2.92 | 2.2 ± 2.77 | -3.56 ± 3.11 | -4.48 ± 3.65 | -5.42 ± 3.85 | -5.04 ± 3.65 |
| **Mesophilous snails** | **Abundance** | **0.14 ± 0.03** | **-0.12 ± 0.03** | **-0.08 ± 0.03** | **-0.08 ± 0.03** | **-0.09 ± 0.04** | **-0.1 ± 0.03** | 0.08 **±** 0.04 | 0.06 **±** 0.04 | 0.07 **±** 0.05 | **0.1 ± 0.04** |
| **α-diversity** | **1.49 ± 0.32** | **-2.94 ± 1.04** | -0.53 ± 0.38 | -0.51 ± 0.46 | -0.89 ± 0.53 | **-1.4 ± 0.56 \*** | 1.73 ± 1.09 | -14.98 ± 20.58 | 1.56 ± 1.32 | **2.94 ± 1.19** |
| **β-diversity** | 3.39 ± 2.53 | **13.36 ± 3.42** | 4.68 ± 2.89 | 5.22 ± 3.39 | **9.21 ± 3.57** | **9.04 ± 3.39** | -6.71 ± 3.91 | -4.97 ± 4.59 | -9.46 ± 4.84 | **-14.49 ± 4.59** |
| **Stone snails** | **Abundance** | 0.07 ± 0.04 | 0.02 ± 0.05 | -0.05 ± 0.04 | -0.05 ± 0.05 | -0.04 ± 0.05 | -0.05 ± 0.05 | 0.08 ± 0.05 | 0.07 ± 0.06 | 0.06 ± 0.07 | 0.04 ± 0.06 |
| **α-diversity** | 0.41 ± 0.39 | -0.18 ± 0.59 | -0.48 ± 0.48 | -0.41 ± 0.59 | -0.18 ± 0.59 | -0.63 ± 0.64 | 0.59 ± 0.69 | 0.36 ± 0.83 | 0.65 ± 0.82 | 0.99 ± 0.85 |
| **β-diversity** | **7.04 ± 1.64** | 1.58 ± 2.25 | 1.94 ± 1.88 | 1.16 ± 2.2 | 1.37 ± 2.32 | 2.09 ± 2.2 | -3.03 ± 2.57 | -0.88 ± 3.02 | -3.67 ± 3.18 | -5.28 ± 3.02 |
| **Herb snails** | **Abundance** | 0.002 ± 0.08 | 0.03 ± 0.11 | -0.002 ± 0.09 | 0.001 ± 0.11 | -0.002 ± 0.11 | -0.002 ± 0.11 | 0.01 ± 0.13 | 0.19 ± 0.15 | -0.03 ± 0.16 | 0.15 ± 0.15 |
| **α-diversity** | -1.39 ± 1.02 | 0.69 ± 125.4 | -20.08 ± 127.2 | 4.7 ± 1.25 | -20.38 ± 267.1 | -20.24 ± 222.3 | 20.51 ± 127.2 | 0.0003 ± 1.54 | 20.38 ± 261.7 | 21.12 ± 222.3 |
| **β-diversity** | **3.75 ± 0.47** | -0.25 ± 0.67 | 0.25 ± 0.54 | -0.35 ± 0.63 | 0.25 ± 0.67 | 0.25 ± 0.63 | -0.59 ± 0.76 | -0.15 ± 0.89 | -0.25 ± 0.94 | -1.55 ± 0.89 |
| **Shrub snails** | **Abundance** | 0.005 ± 0.008 | -0.005 ± 0.009 | 0.01 ± 0.009 | 0.009 ± 0.01 | -0.002 ± 0.01 | 0.009 ± 0.01 | -0.008 ± 0.01 | 0.001 ± 0.01 | 0.002 ± 0.01 | -0.009 ± 0.01 |
| **α-diversity** | -0.69 ± 0.7 | -21.01 ± 257.6 | 0.32 ± 078 | -0.92 ± 1.2 | -0.69 ± 1.2 | 0.18 ± 0.91 | 19.5 ± 257.6 | 21.01 ± 257.6 | -3.29 ± 190.3 | -4.83 ± 237.1 |
| **β-diversity** | **2.5 ± 0.25** | 0.5 ± 0.31 | -0.19 ± 0.28 | 0.3 ± 0.33 | 0.25 ± 0.35 | -0.2 ± 0.33 | 0.04 ± 0.35 | -0.5 ± 0.41 | -0.25 ± 0.43 | 0.2 ± 0.41 |
| **Hummus snails** | **Abundance** | **0.1 ± 0.02** | **-0.1 ± 0.02** | -0.04 ± 0.02 | -0.05 ± 0.02 | -0.05 ± 0.02 | **-0.06 ± 0.02** | 0.05 ± 0.03 | 0.05 ± 0.03 | 0.05 ± 0.03 | 0.06 ± 0.03 |
| **α-diversity** | **1.45 ± 0.26** | -22.37 ± 175.1 | -0.51 ± 0.32 | -0.57 ± 0.39 | -0.89 ± 0.47 | **-1.26 ± 0.49** | 20.67 ± 175.1 | -67.41 ± 300.1 | -15.96 ± 335.5 | 21.28 ± 175.1 |
| **β-diversity** | 2.35 ± 1.69 | **9.65 ± 2.39** | 3.34 ± 1.93 | 3.85 ± 2.27 | **6.4 ± 2.39** | **6.25 ± 2.27** | -4.19 ± 2.73 | -3.85 ± 3.21 | -6.4 ± 3.38 | **-8.85 ± 3.21** |
| **Conservation aspects** | **Threatened snails** | -0.22 ± 0.0002 | 0.2 ± 0.0002 | 0.19 ± 0.0002 | 0.001 ± 0.0003 | -0.03 ± 0.0004 | -0.06 ± 0.0003 | -0.18 ± 0.0002 | -0.22 ± 0.0003 | 0.73 ± 0.0004 | 0.93 ± 0.0003 |
| **Endemism snails** | **-19.48 ± 1.97** | **18.78 ± 2.01** | **18.01 ± 2.03** | **17.87 ± 2.22** | **18.09 ± 2.12** | **18.56 ± 2.06** | **-18.09 ± 2.09** | **-18.78 ± 2.47** | **-17.68 ± 2.21** | **-18.09 ± 2.15** |
| **β-diversity** | **2.5 ± 0.25** | 0.5 ± 0.31 | -0.19 ± 0.28 | 0.3 ± 0.33 | 0.25 ± 0.35 | -0.2 ± 0.33 | 0.04 ± 0.35 | -0.5 ± 0.41 | -0.25 ± 0.43 | 0.2 ± 0.41 |

# Table S5

## Effect of environmental variables on snails.

Summary of the selected model, derived from generalized linear mixed models (GLMM) analyses of the 13 common land snails. The table shows the model parameter coefficient (b) and its standard error (±SE), and the relative importance of each variable (RVI) in brackets.

If the variable were significant (p-values < 0.05) the parameters of the variable in question are shown in bold type. The RVI ranges from 0 to 1 so the explanatory variable was considered robust if it had an RIV > 0.9; a moderate effect between 0.6 and 0.9; a weak effect between 0.5 and 0.6; and no effect below 0.5. Significant and/or upper to moderate RIV (> 0.6) values were highlighted on grey cells.

CDW corresponds to coarse woody debris and FDW to fine woody debris.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Species**  | **Intercept** | **Plant cover** | **Plant succession** | **CWD** | **FDW** | **Rocky land** | **Stones** | **Leaf litter** |
|
| ***Cepaea nemoralis*** | **-3.82 ± 1.43** | 0.33 ± 0.22 (0.26) | 0.75 ± 0.46 (0.52) | 0.12 ± 0.08 (0.25) | 0.09 ± 0.08 (0.14) |  |  | 0.08 ± 0.043 (0.88) |
| ***Cernuella virgata*** | -3.24 ± 1.92 | -0.52 ± 0.77 (0.17) |  |  |  | 0.51 ± 0.34 (0.38) |  | **-0.44 ± 0.19 (1.0)** |
| ***Cornu aspersum*** | -2.15 ± 1.35 | 0.44 ± 0.32 (0.34) | -1.18 ± 0.79 (0.4) | -0.21 ± 0.17 (0.08) | 0.09 ± 0.09 (0.06) | -0.25 ± 0.24 (0.15) | 0.43 ± 0.33 (0.36) | **-0.14** ± **0.06 (0.82)** |
| ***Ferussacia folliculum*** | **-5.51 ± 2.68** | -0.67 ± 0.64 (0.07) | 1.19 ± 0.69 (0.79) |  | -0.32 ± 0.24 (0.4) | **0.72 ± 0.35 (0.41)** | -0.87 ± 0.67 (0.41) | -0.08 ± 0.05 (0.21) |
| ***Granopupa granum*** | -5.28 ± 2.79 | 0.47 ± 0.55 (0.08) | 1.39 ± 0.93 (1.0) | 0.33 ± 0.2 (1.0) | -0.21 ± 0.22 (0.21) | 0.38 ± 0.35 (0.19) | -0.6 ± 0.76 (0.09) | 0.08 ± 0.06 (0.48) |
| ***Oxychilus courquini*** | **-2.85 ± 0.74** | **-1.11 ± 0.35 (1.0)** | 0.24 ± 0.29 (0.23) | -0.07 ± 0.08 (0.25) |  |  |  |  |
| ***Paralaoma servilis*** | **-10.61 ± 3.95** |  | 1.02 ± 0.67 (0.11) | 0.32 ± 0.23 (0.44) |  |  | 1.58 ± 0.96 (0.62) | 0.1 ± 0.07 (0.38) |
| ***Pomatias elegans*** | **-2.68 ± 1.0** | 0.38 ± 0.24 (0.6) | **0.51 ± 0.2 (0.35)** |  | 0.07 ± 0.06 (0.36) | -0.15 ± 0.27 (0.08) |  | **0.05 ± 0.02 (0.65)** |
| ***Pseudotachea splendida*** | **-3.66 ± 1.1** | -0.3 ± 0.25 (0.16) | 0.44 ± 0.31 (0.19) | **0.21 ± 0.09** (1.0) | 0.09 ± 0.08 (0.13) |  | 0.28 ± 0.26 (0.1) | 0.04 ± 0.02 (0.53) |
| ***Truncatellina callicratis*** | **-5.01 ± 1.99** | -0.41 ± 0.29 (0.22) | 0.9 ± 0.48 (0.55) | 0.13 ± 0.1 (0.11) |  |  | 0.96 ± 0.62 (0.52) | **0.08 ± 0.04 (0.64)** |
| ***Vitrea sp.*** | **-3.64 ± 1.04** | 0.2 ± 0.18(0.2) | 0.3 ± 0.37 (0.16) |  | -0.05 ± 0.08 (0.14) |  | 0.23 ± 0.37 (0.14) | **0.1 ± 0.03****(1.0)** |
| ***Xerocrassa montserratensis*** | -2.53 ± 1.31 | 0.24 ± 0.31 (0.16) | **-1.67 ± 0.84 (1.0)** | -0.44 ± 0.28 (0.85) | -0.07 ± 0.09 (0.15) |  |  | -0.12 ± 0.16 (0.3) |
| ***Xerocrassa penchinati*** | **1.37 ± 0.53** | **-0.32 ± 0.09 (0.5)** | **-0.64 ± 0.32 (0.69)** | **-0.16 ± 0.04 (1.0)** |  |  |  | **-0.06 ± 0.02 (0.72)** |