# SUPPLEMENTARY MATERIAL

## Article: A multi-nutrient budget helps to understand masting regulation in beech forests along a fertility gradient

Jeanne Touche[1], Marie-Pierre Turpault[1], Philippe Santenoise[1], Paul-Olivier Redon[2], Christophe Calvaruso [3]

[1] INRAE, BEF, F-54000 Nancy, France
[2]Andra, R&D Division, Centre de Meuse/Haute-Marne, 55290 Bure, France
[3]EcoSustain, Environmental Engineering Office, Research and Development, Kanfen, 57330, France

*Correspondence to*: Jeanne Touche (JeanneTouche@inrae.fr)

Journal : Biogeoscience

**Table S1 :** Correcting factors ($f_{CE}$ in the article : part of fruit leaching in total canopy leaching fluxes) applied for leaf resorption calculation during each mast year, for the three ecosystems. Fruit influence on canopy leaching was considered negligeable (factor=0) when CEsV2-CEsV1<0. Fruit leaching was considered as 100% of canopy leaching when CEsV2>0 and CEsV1<0.

| Mast Year | Ecosystem | K | P | Mg | N | S |
|---|---|---|---|---|---|---|
| | | *% of canopy leaching* | | | | |
| 2014 | S1 | 0 | 0 | 0 | 0 | 63 |
| | S2 | 6 | 0 | 3 | 0 | 66 |
| | S3 | 7 | 0 | 22 | 0 | 62 |
| 2016 | S1 | 59 | 47 | 74 | 100 | 88 |
| | S2 | 63 | 51 | 66 | 100 | 94 |
| | S3 | 60 | 53 | 69 | 100 | 98 |
| 2020 | S1 | 0 | 0 | 6 | 0 | 58 |
| | S2 | 2 | 0 | 25 | 0 | 40 |
| | S3 | 1 | 0 | 14 | 0 | 25 |
| 2023 | S1 | 27 | 34 | 29 | 92 | 66 |
| | S2 | 21 | 38 | 40 | 86 | 74 |
| | S3 | 8 | 33 | 44 | 62 | 82 |

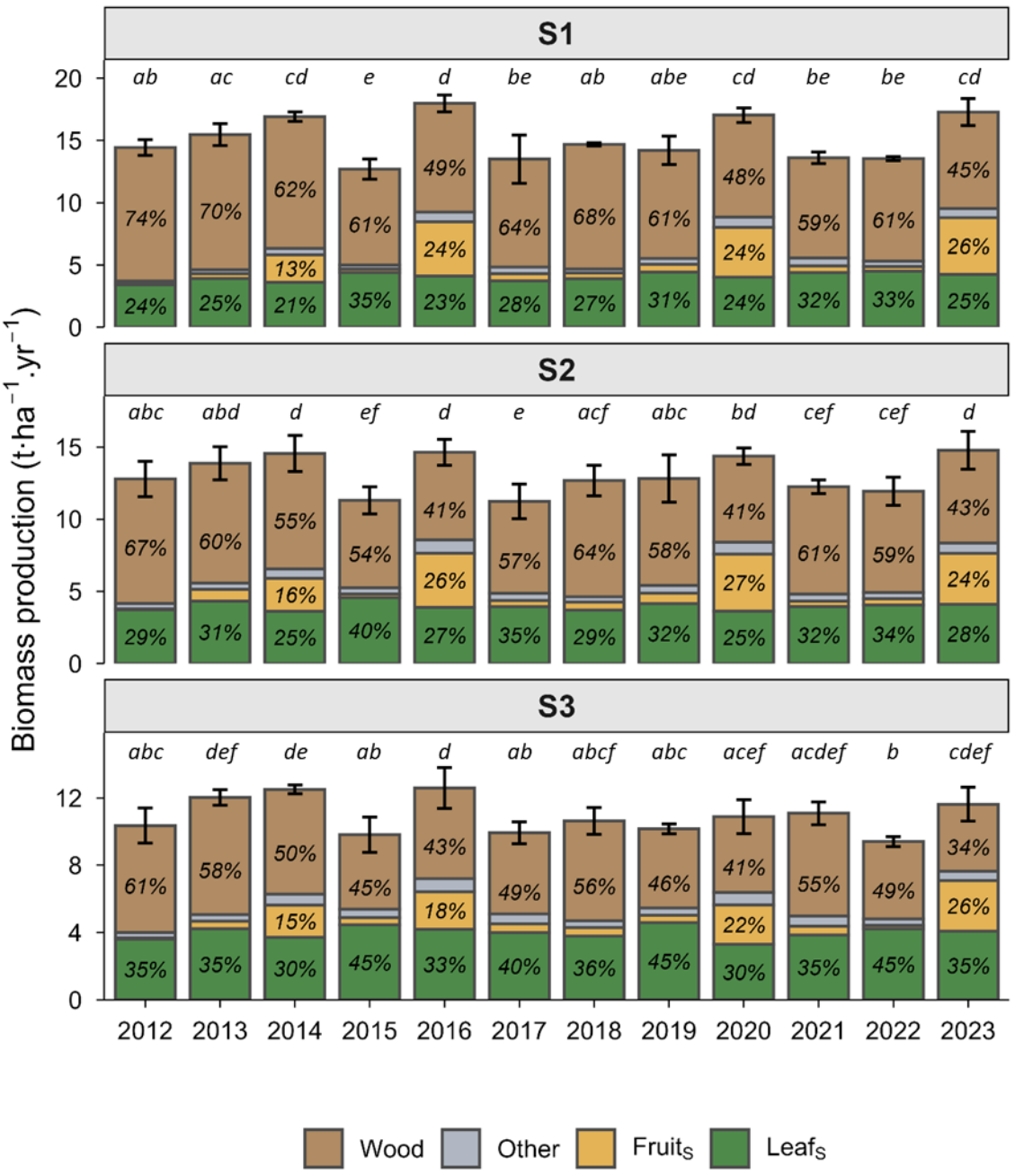


**Figure S1 :** Annual production (t.ha$^{-1}$.yr$^{-1}$) of total biomass with the repartition between wood, senesced leaves, senesced fruits and other non perennial parts ('Other'), from 2012 to 2023 in the three studied ecosystems (S1, S2, S3). Asterix indicate significant differences between MY and NMY without ecosystem distinction (*<0,05 ; ** < 0,01 ; *** < 0,001). For each ecosystem, different letters indicate significant differences among years, with a threshold p value of 0,05. In each compartment, the percentage of partitionning of the total biomass is mentionned.

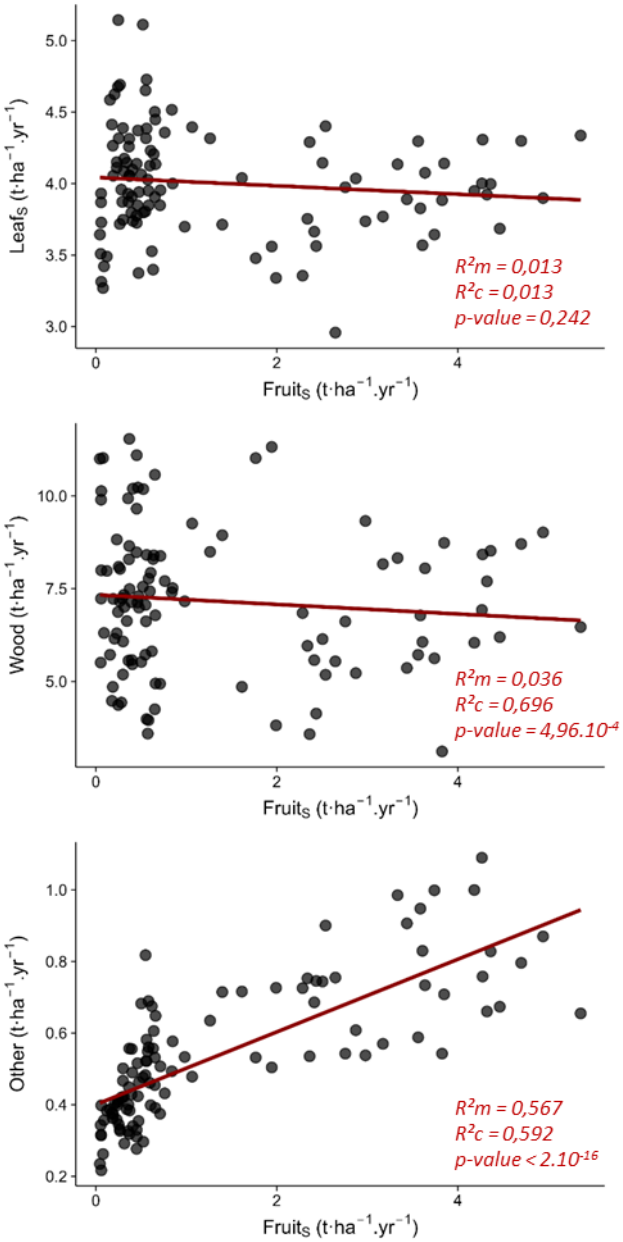


**Figure S2 :** Scatter plots of the relationship between fruit biomass production (t.ha-1.yr-1) and the biomass productions of leaves, wood or other . Results (regression line, $R^2$ marginal and conditionnal and p-value) of the linear mixed models are given in each scatter plot.