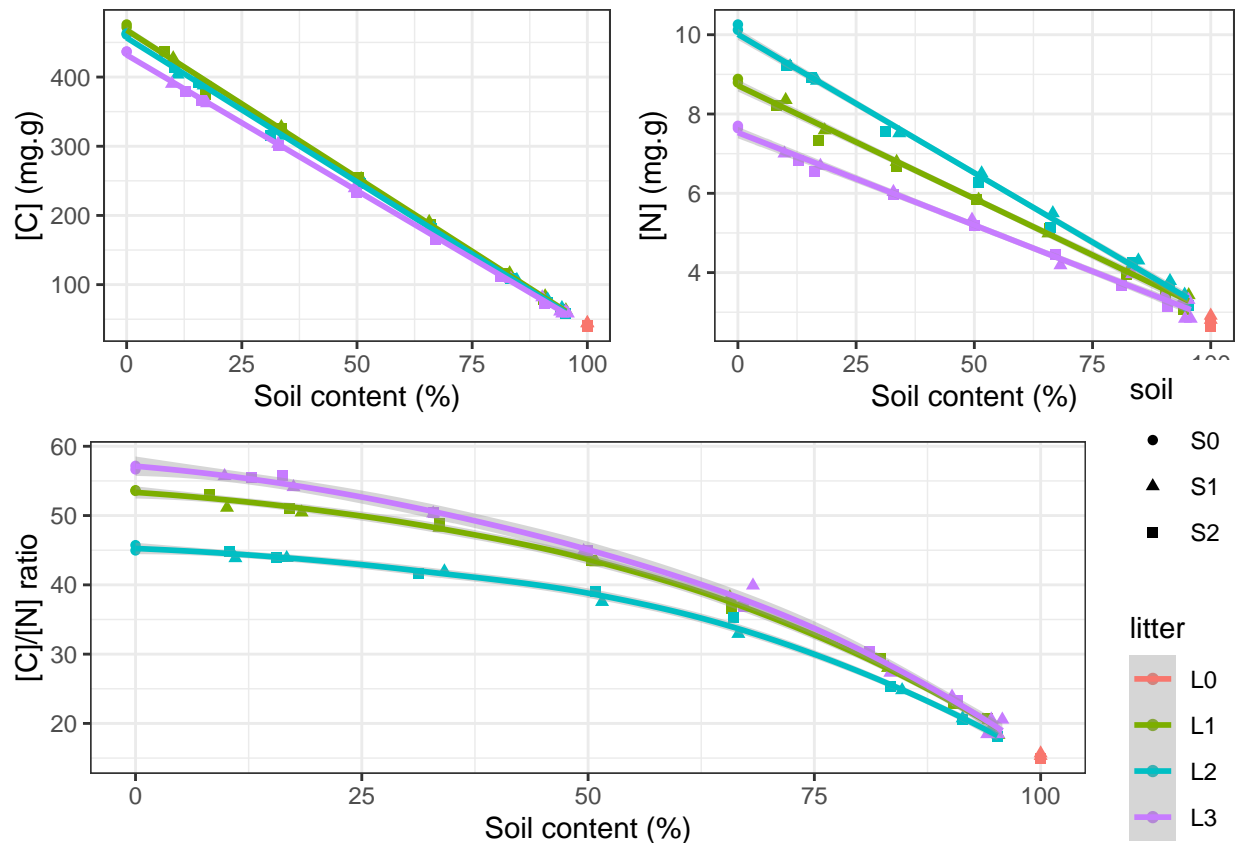


## Supplementary material I-S2

### Effect of soil contamination on litter carbon (C) and nitrogen (N) measurements

#### Estimation of soil contamination effect on C and N measurements

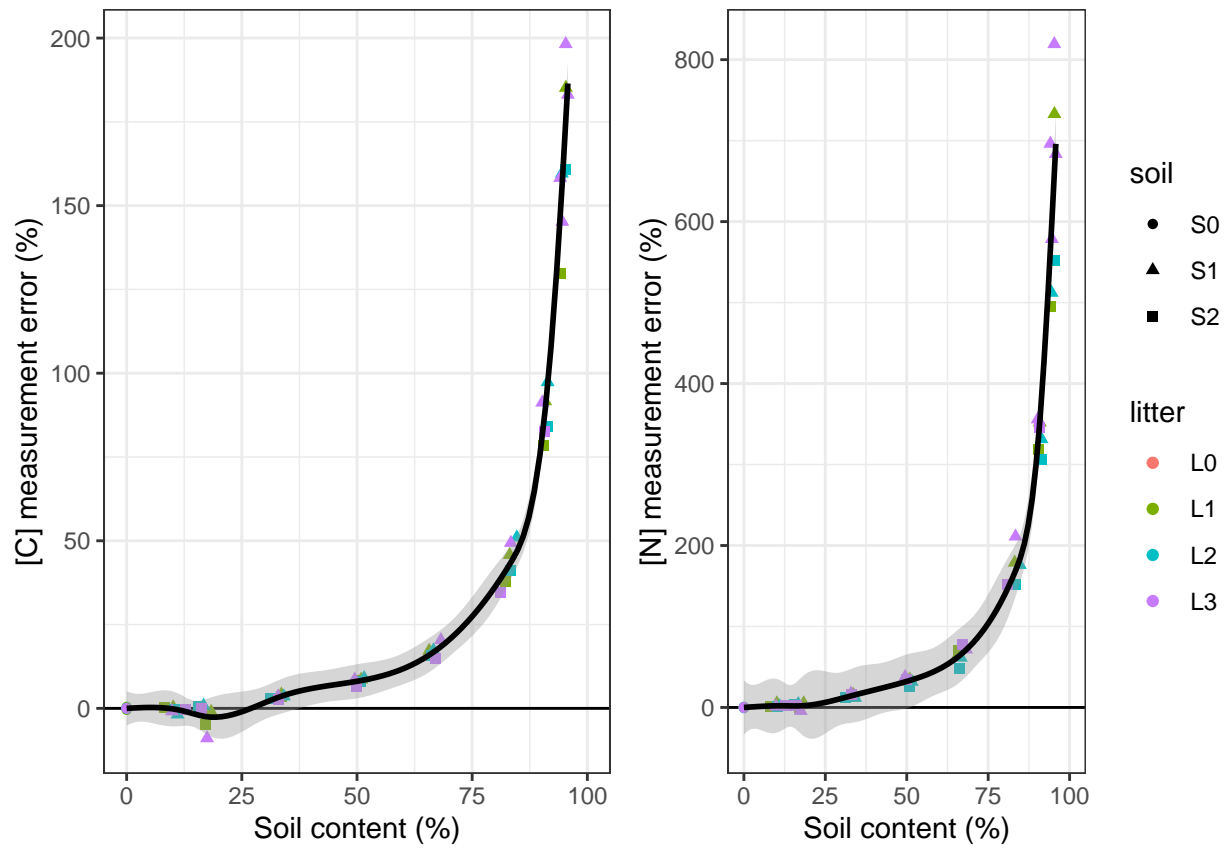
To test the effect of soil contamination on carbon and nitrogen measurements, we prepared calibration samples where soil contamination was manipulated from 0% to 100% of the total sample mass. The litter was collected in litter traps to avoid soil contamination from three monocultures (*Sapium sebiferum*, *Castanea Henryi*, *Liquidambar formosana*), soil was collected from two distant plots (K19 and T17) with contrasting chemical composition (see Scholten *et al.* 2017). For each pair of soil and litter types, 1 g of soil:litter mix was prepared for the following ratio: 1:0, 5:1, 2:1, 1:1, 1:2, 1:5, 1:10, 0:1. The sample carbon and nitrogen content were measured with an elemental analyzer (Vario EL Cube, Elementar, Langenselbold, Germany)



## Measurement error due to soil contamination

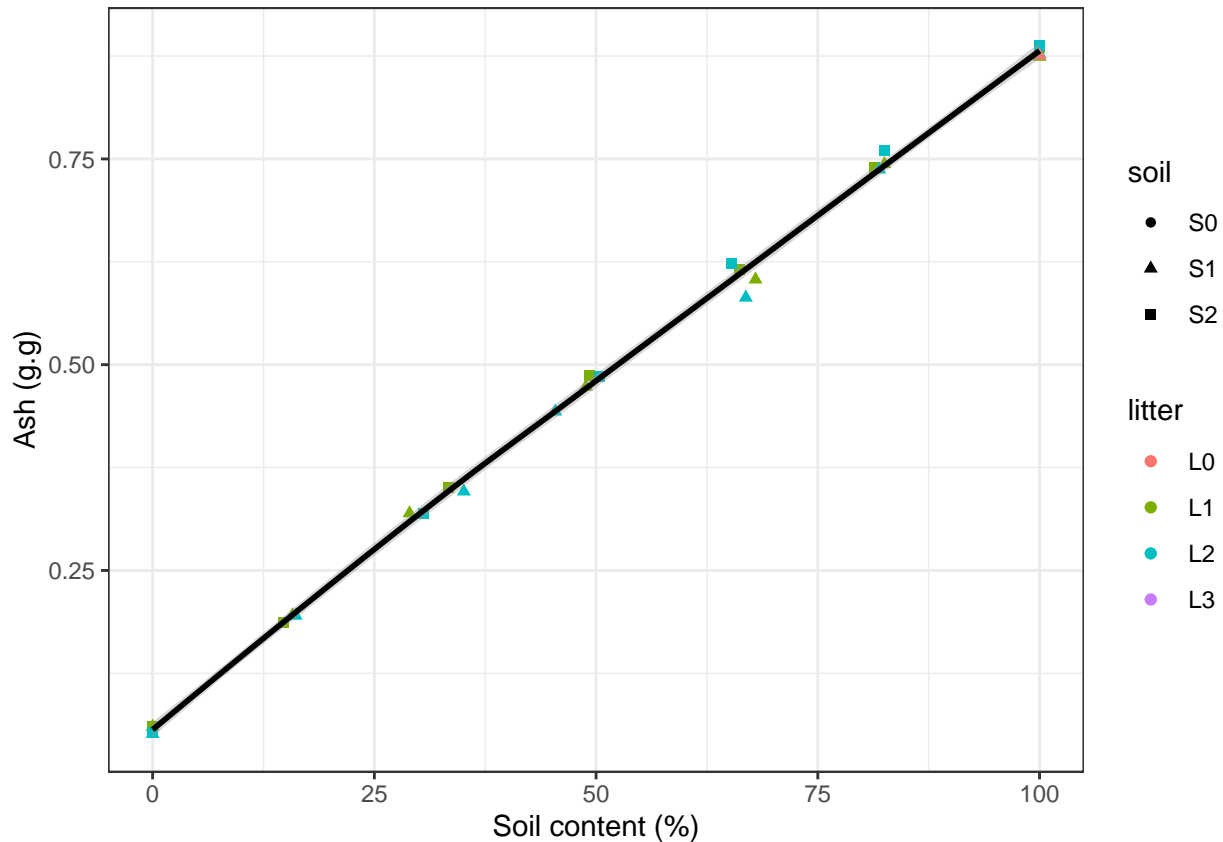
Measurement error calculation:

$$\text{Measurement.error} = 100 \times \frac{(\text{measured} - \text{introduced})}{\text{introduced}}$$



# Using ash measurements to estimate and correct soil contamination

To estimate soil contamination from our samples, we used measured ash content from our calibration samples and tested the linear relationship between soil contamination (%) and ash content (g.g). The ash content of the samples was measured using the loss on ignition method where the samples are incinerated in a muffle oven at 550°C (Nabertherm GmbH, Lilienthal, Germany).



```
##
## Call:
## lm(formula = ash.content ~ soil.conta, data = df.ash)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -0.032487 -0.008449  0.000179  0.007138  0.022679
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept) 6.347e-02  3.756e-03   16.9 3.2e-16 ***
## soil.conta  8.231e-03  6.233e-05  132.1 < 2e-16 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.01208 on 28 degrees of freedom
## (17 observations deleted due to missingness)
## Multiple R-squared:  0.9984, Adjusted R-squared:  0.9983
## F-statistic: 1.744e+04 on 1 and 28 DF,  p-value: < 2.2e-16
```

According to our measurements, soil contamination linearly increases ash content. In addition, litter ash content (estimate +/- SE = 0.063 +/- 0.004 g/g, i.e., model intercept) is neglectable in comparison to soil ash content (.886 +/- 0.004 g/g).

Therefore, we can estimate soil carbon and nitrogen addition into the sample using:

$$\Leftrightarrow \text{soil.content} = \frac{Ash_{sample}}{Ash_{soil}}$$

$$\Leftrightarrow \text{soil.content} = \frac{Ash_{sample}}{1 - SOM}, \text{ when } Ash_{soil} = 1 - SOM$$

$$\Rightarrow [C]_{litter} = [C]_{sample} - [C]_{soil} \times \text{soil.content}$$

$$\Leftrightarrow [C]_{litter} = [C]_{sample} - [C]_{soil} \times \frac{Ash_{sample}}{1 - SOM}$$

Equivalent for N content with:

$$[N]_{litter} = [N]_{sample} - [N]_{soil} \times \frac{Ash_{sample}}{1 - SOM}$$