This file explains variables and datasets accompanying: Slate, Sullivan and Callaway. Desiccation and rehydration of mosses greatly increases resource fluxes that alter soil carbon and nitrogen cycling.

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**dataset**: SlateThroughfall\_TOC\_TN\_2019

These data were used when analyzing differences in throughfall TOC and TN from hydrated and rehydrated mosses with two-way ANOVAs.

species: There are eight moss species.

treatment: dry = mosses desiccated and rehydrated; wet = mosses were constantly hydrated

TOC\_area: TOC (mg cm-2) of each sample scaled to the area of the sample.

TOC\_mass: TOC (mg g-1) of each sample scaled for the wet mass of the sample.

TN\_area: TN (mg cm-2) of each sample scaled to the area of the sample.

TN\_mass: TN (mg g-1) of each sample scaled for the wet mass of the sample.

**dataset:** SlateThroughfall\_regressions\_2019

These data were used to evaluate relationships between the C, N or C:N ratio of throughfall and the cumulative CO2 and N2O efflux.

species: 1 = *Syntrichia*, 2 = *Racomitrium*, 3 = *Dicranum*, 4 = *Rhytidadelphus*

treatment: (see above)

CO2\_flux\_ug: cumulative CO2 efflux (µg C g soil-1) over a 48 h soil incubation

N2O\_flux\_ug: cumulative N2O efflux (µg N g soil-1) over a 48 h soil incubation

C\_added\_ug: average amount of C (µg) added in moss throughfall for each species

N\_added\_ug: average amount of N (µg) added in moss throughfall for each species

CtoN\_added: mean C:N ratio of throughfall added for each moss species

**dataset:** SlateThroughfall\_GasFlux\_2019

These data were used to evaluate the independent and interactive effects of moss species and the moss desiccation treatment on the cumulative CO2 and N2O efflux (48 h) and the CO2 and N2O efflux at the 6 and 24 h time points during the soil incubation.

species: 1 = *Syntrichia*, 2 = *Racomitrium*, 3 = *Dicranum*, 4 = *Rhytidadelphus*

treatment: dry and wet described above, water = control

CO2\_C\_6h: CO2 efflux (mg C g soil-1) 6 h into a soil incubation

CO2\_C\_24h: CO2 efflux (mg C g soil-1) 24 h into a soil incubation

CO2\_C\_48h: CO2 efflux (mg C g soil-1) 48 h into a soil incubation

N2O\_N\_6h: N2O efflux (ng N g soil-1) 6 h into a soil incubation

N2O\_N\_24h: N2O efflux (ng N g soil-1) 24 h into a soil incubation

N2O\_N\_48h: N2O efflux (ng N g soil-1) 48 h into a soil incubation