ANNOTATED BIBLIOGRAPHY: CROSSMARK & SPRINGER SINCE MAY 2019

SAVAGE, DAVIDSON, ABRAMOFF, FINZI, AND GIASSON (2018)

**Keywords: autotrophic respiration; bayesian modeling; heterotrophic respiration; trenching**

Title: Partitioning soil respiration: quantifying the artifacts of the trenching method

*Introduction (Savage et al., 2018):* Trenching method is used to address the influence of environmental controls on each component (*Ra* and *Rh*). The trenching method is imperfect because there are many cons associated with its execution. It disturbs soil and increases moisture; subsequently, this leads to an overestimation of *Rh*. Recently severed roots (RSR) increase the available carbon substrate for *Rh*, an important source of CO2 product. and can continue for months to years. RSR and rhizosphere processes further contribute to overestimation of *Rh*. The goal of the study is to determine daily, seasonal, and annual contributions of *Rh* and *Ra* and how they are related to *Rt* through the trenching method.

*Method (Savage et al., 2018):* Pre-treatment soil respiration, moisture and temperature were collected before the trench was dug for later comparison. Water impermeable plastic tarp was placed along the wells of the trench to prevent new root growth in that area. They used one large trenched plot with four replications, and although this is considered pseudo-replication, this was the best option due to the amount of disturbance from using the trenching method. A two-year root decomposition study was conducted to account for carbon loss derived from decomposing roots.

*Results (Savage et al., 2018):* *Ra* contributed less to *Rt* in the spring and fall. In spring and fall of 2014, Rh was greater than *Rt*, however, in summer months *Rt* was greater than *Rh*.

*Discussion (Savage et al., 2018):* Recently severed roots reduced observed Rh overall. Eliminating root inputs during trenching reduces the contribution of *Rh* to *Rt*. *Ra* and *Rh* are seasonal trends. It can take up to 8 years for fine roots to lose 90% of their mass in the soil. Unexpected root growth in exclusion collars most likely effected results. *Rh* is the dominant component to *Rt* during dry and drought-induced treatments, which explains that the difference in moisture and temperature is significant and needs to be controlled. It can differ both daily and seasonally.