

Dear Editor,

We are writing to express our interest in submitting a paper titled “**Trait plasticity and covariance along a continuous soil moisture gradient**” for publication in *New Phytologist*.

In this manuscript we present results from an experiment examining phenotypic responses of multiple genotypes from two species of the model grass *Brachypodium* to a continuous soil moisture gradient. This work advances over previous investigations of plant responses to soil moisture which are generally restricted to measurements in a limited sample of possible environmental conditions - usually only saturated and dry. Instead, by measuring phenotypes across a complete soil moisture gradient, we discover non-linear relationships between plant traits and soil moisture and variation between traits, genotypes, and species that give rise to emergent phenomena with implications for plant evolution of complex traits such as non-linear relationships between trait covariances and evolutionary constraints in relation to soil moisture. We hope that this work will be valuable to researchers working to understand plant x environment interactions and inspire greater consideration of the causes and consequences of non-linearities therein. Further, by demonstrating the combined value of function-valued-trait and multivariate trait covariance analyses, we hope this work will motivate further applications of these approaches through investigations of understudied dimensions of plant diversity. We believe this work will be of broad value to the readership of *New Phytologist*, but expect it will be of particular interest to those working on phenotypic plasticity, physiology, quantitative genetics, and evolution.

A preprint of this work has been peer reviewed by two anonymous reviewers and was recommended by Benoit Pujol through the Peer Community in Evolutionary Biology. The reviews and recommendation of this preprint article can be found here: <https://evolbiol.peercommunityin.org/public/rec?id=231&reviews=True>.

Thank you for your time and consideration.

Best regards,

J. Grey Monroe