

Environmental variation of reflectance spectra across common plant families in South Africa

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Depending on plant family, reflectance spectra vary in response to environmental gradients

QUESTIONS

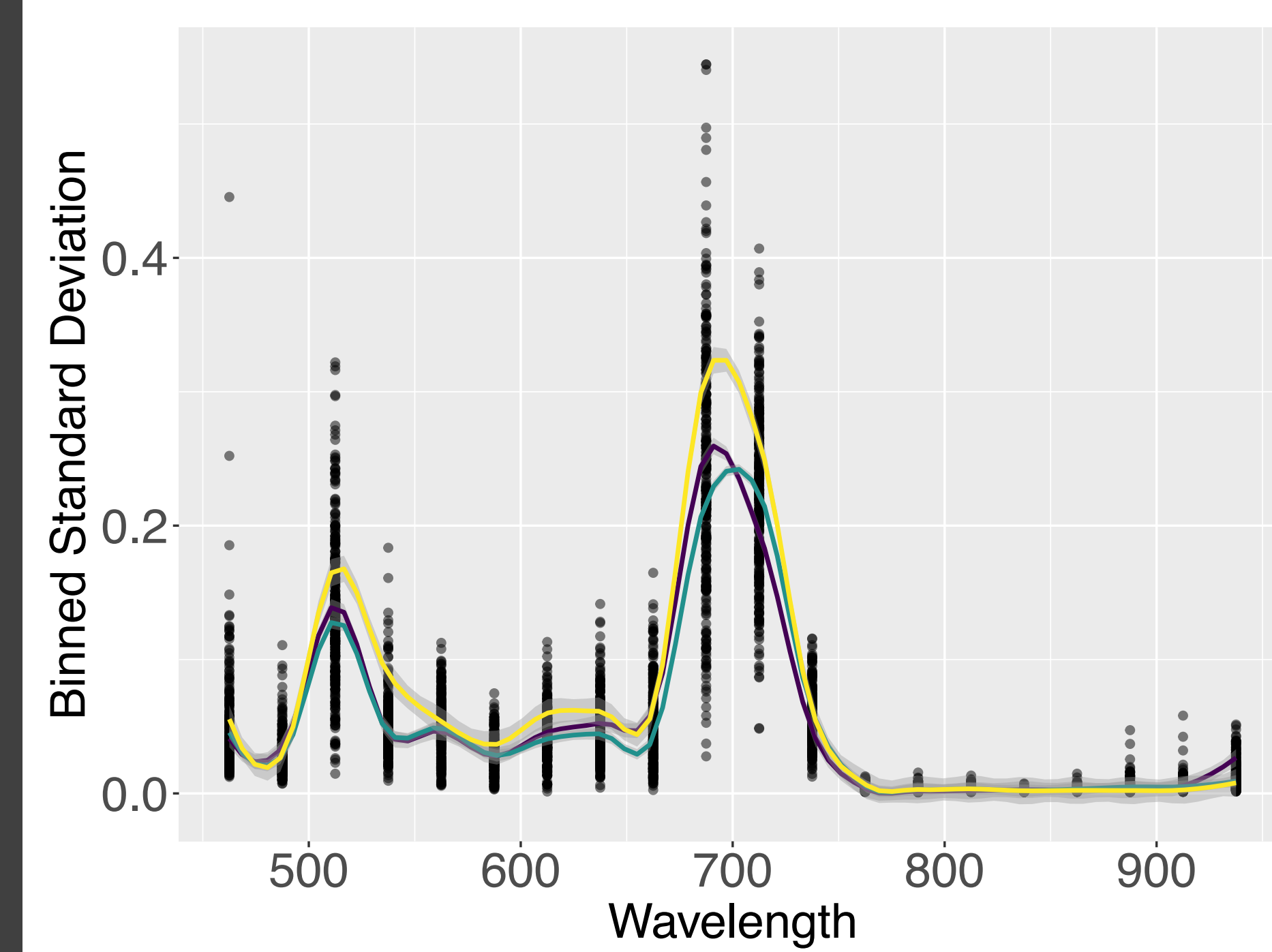
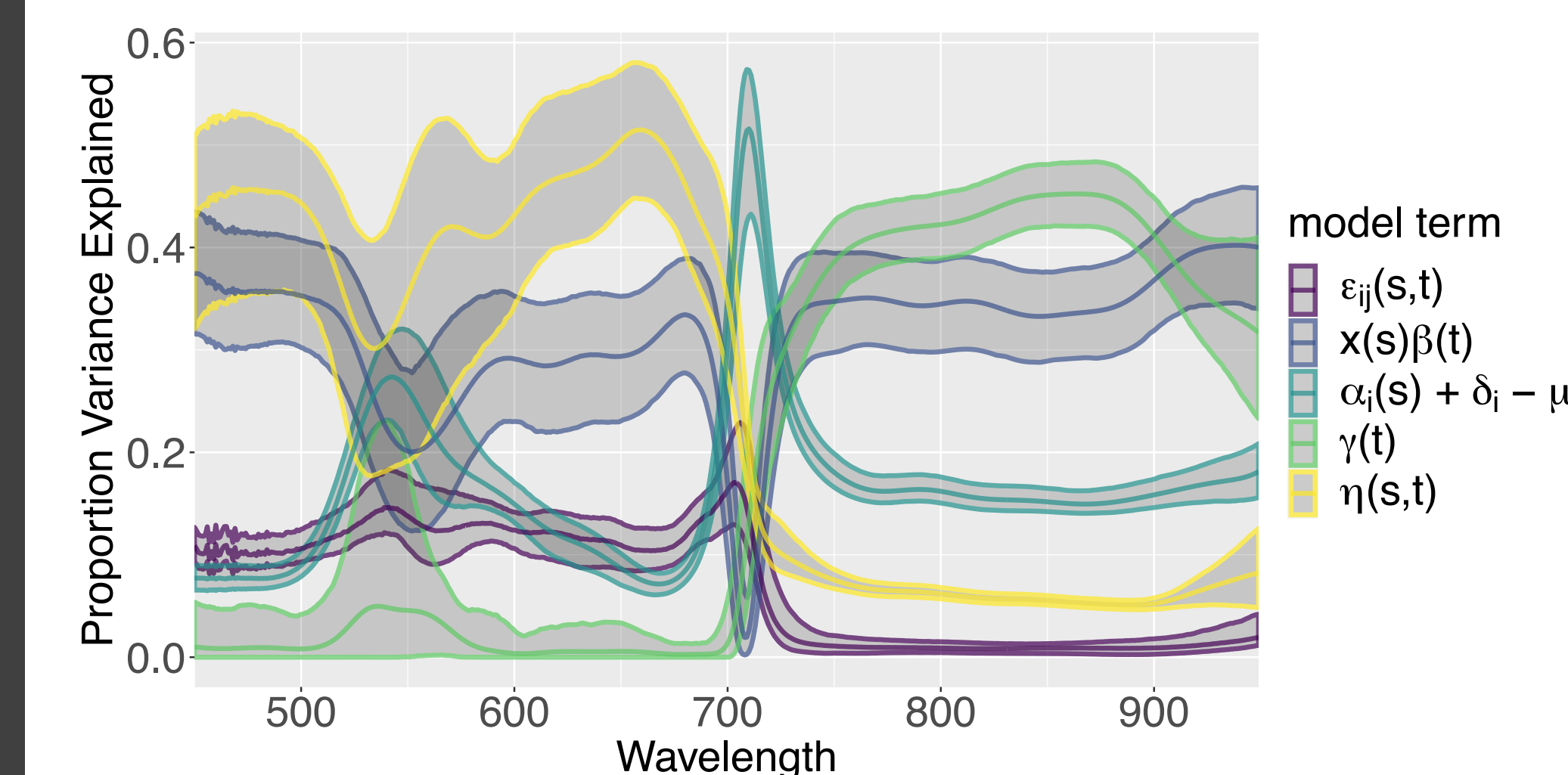
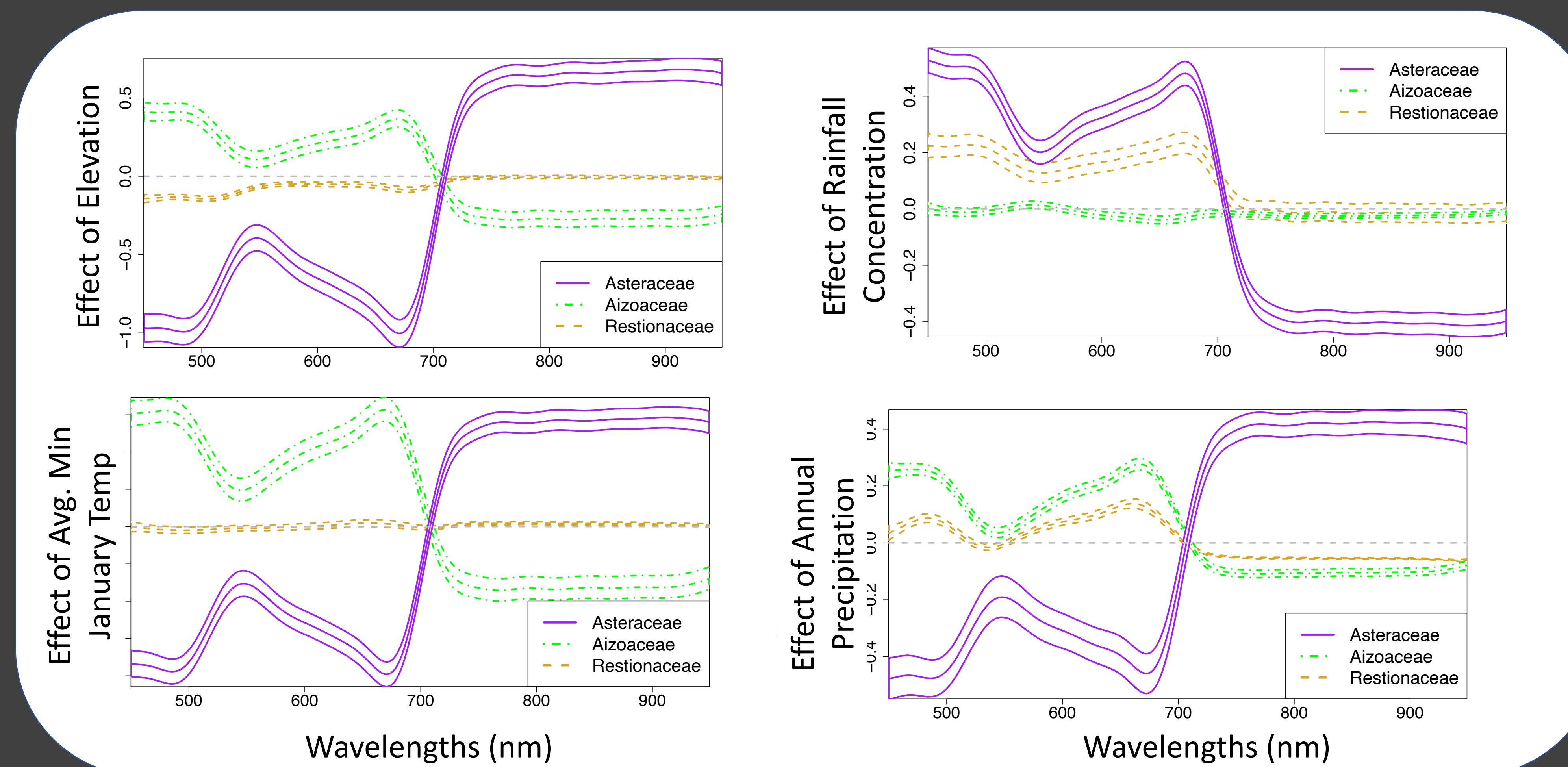
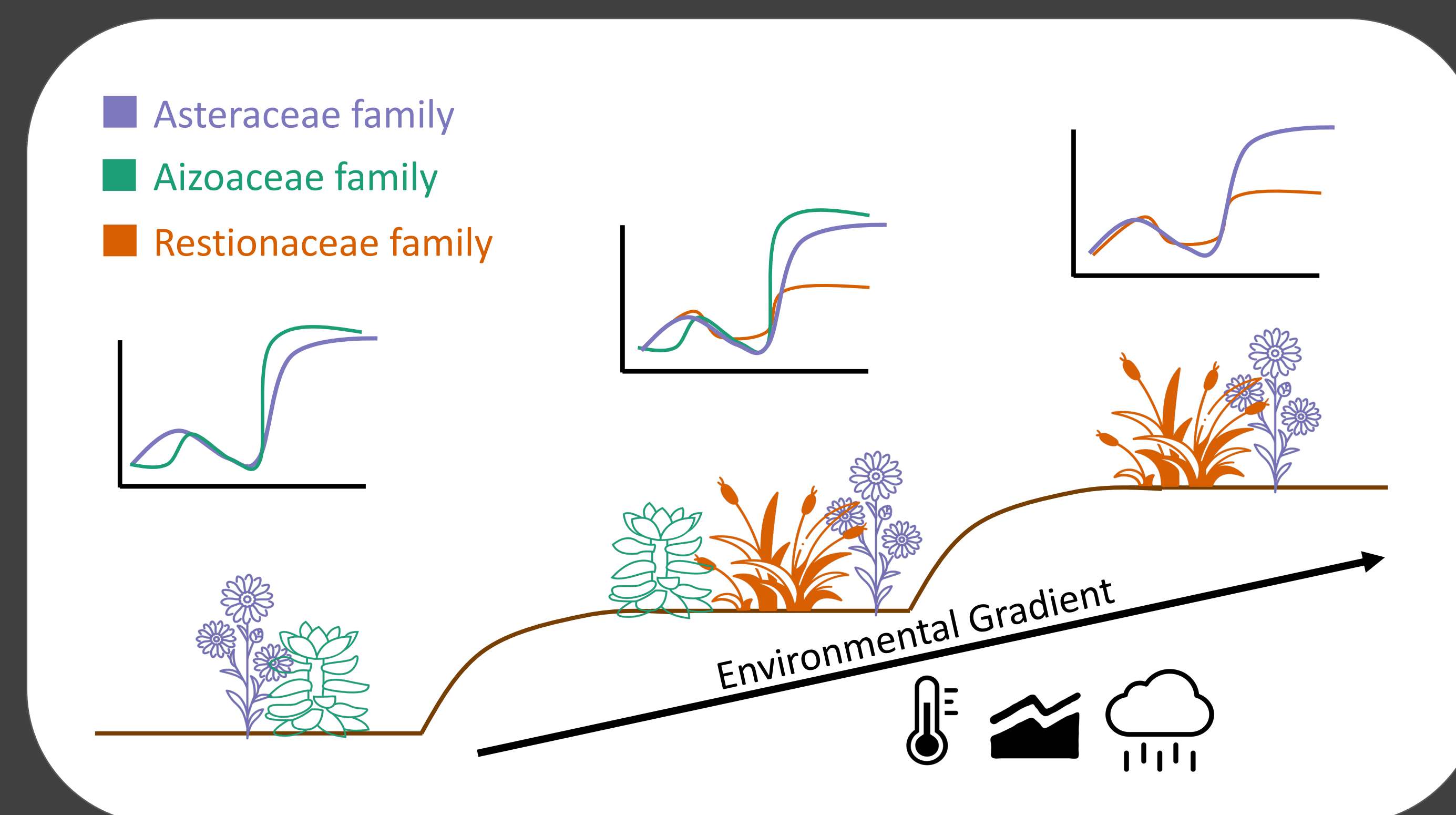
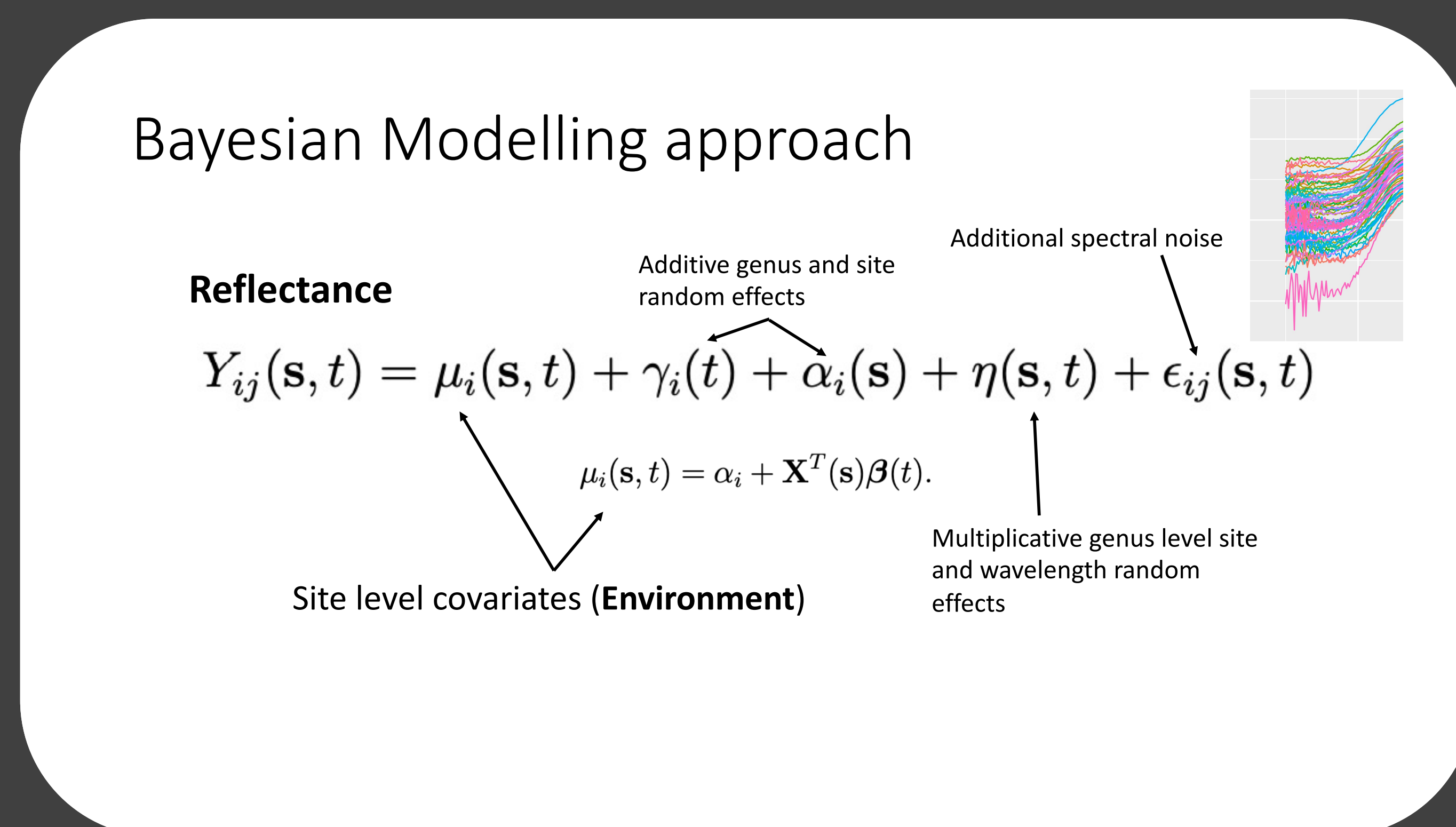
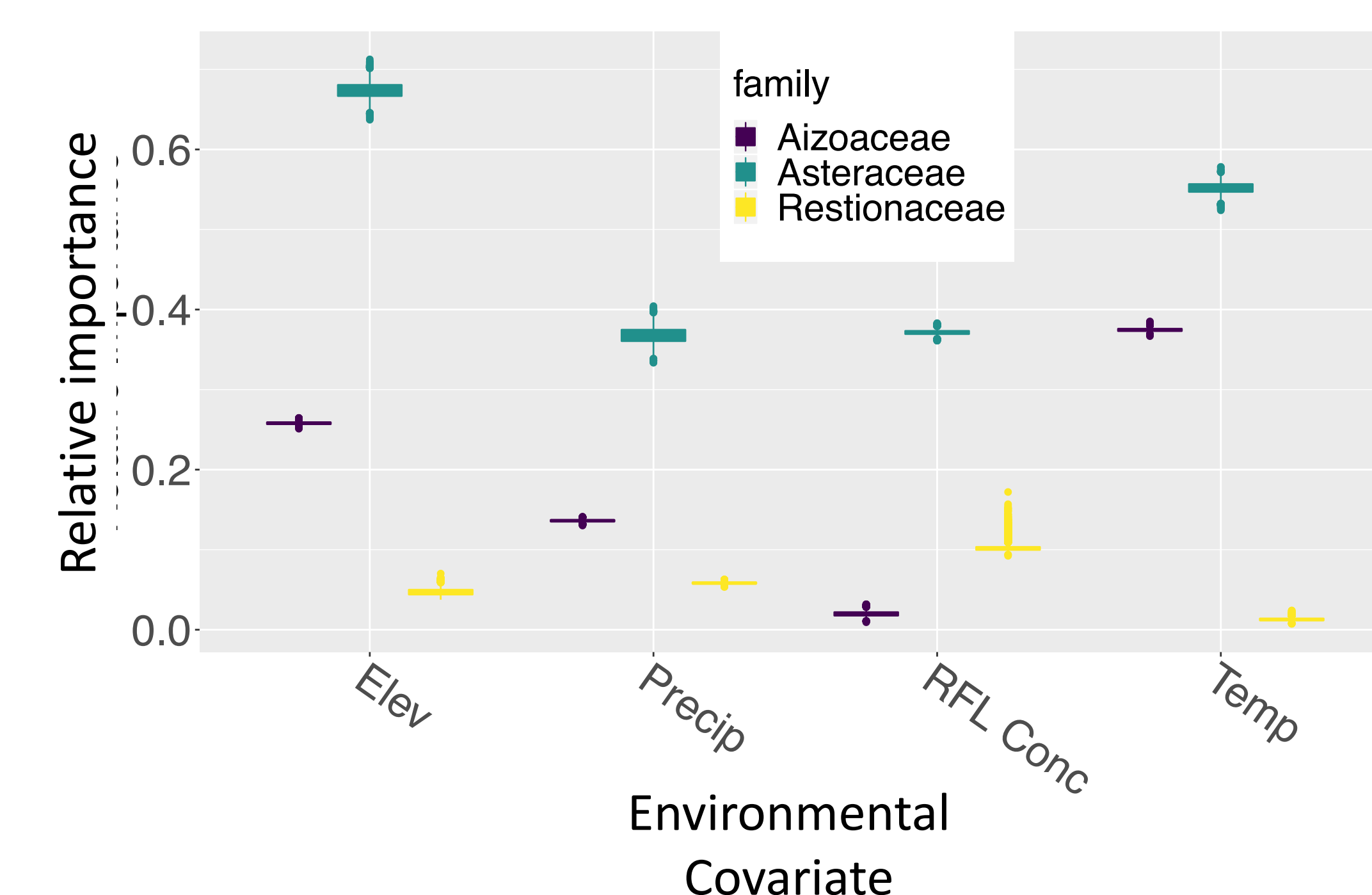
Reflectance spectra are used as both a direct measure and proxy of plant ecology. Ecologists explore how traits vary along environmental gradients within lineages to ask whether those traits are constrained by ancestry or adaptive to environment. Here we ask whether reflectance spectra also do the same and how well spectra can be inferred based on environmental factors.

METHODS

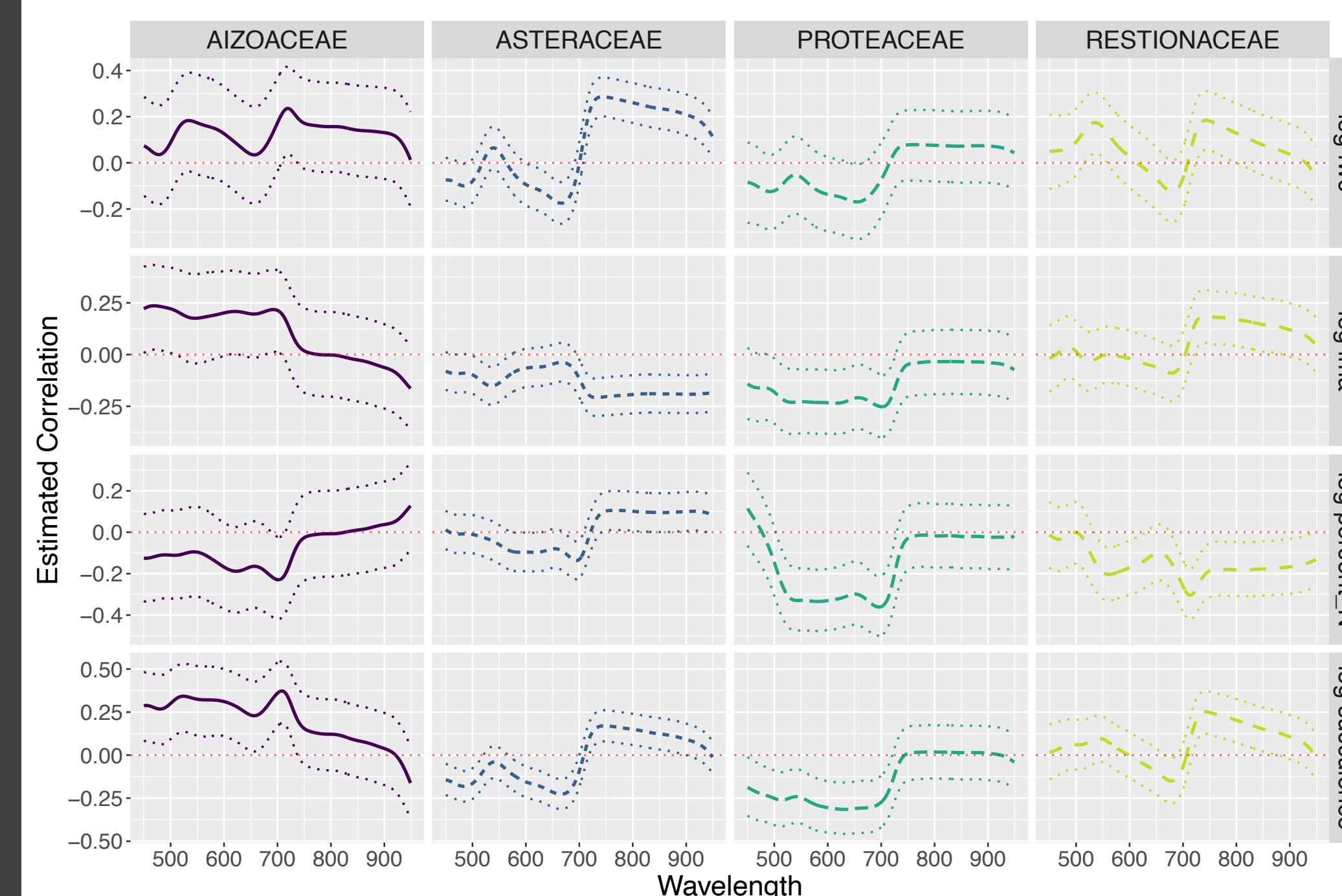
Reflectance spectra (OceanOptics USB4000, 1 nm sampling from 450 to 949 nm) for three plant families (Asteraceae, Aizoaceae, Restionaceae) was collected from individuals distributed across the Cederberg and Hantam-Tanqau-Roggeveld subregion of South Africa's Greater Cape Floristic Region. Modelling was conducted using a novel functional Bayesian approach outlined to the right.

RESULTS

Our models show that environmental factors impact the reflectance spectra of families differently. For instance, elevation is relatively the most important variable for Asteraceae spectra while the average minimum temperature of January most affects the spectra of Aizoaceae



Future Work: We are currently developing a model to understand how reflectance and traits vary in tandem across environmental gradients. The following shows preliminary results for the correlation of trait and reflectance given environment for a similar set of plant species



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