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Morphology and Phylogeny Determine the Pristimantis Frogs' Susceptibility to Global Warming

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Introduction

Multi-sensor fusion for the collection of soil information has been the subject of varying improvements in previous studies, but the underlying prediction mechanisms for spectrally active and inactive properties are still poorly understood. By measuring Mid-Infrared (MIR) and X-ray Fluorescence (XRF) spectra, texture, total and labile Organic Carbon (OC) and Nitrogen (N) content, pH, and Cation Exchange Capacity (CEC) for n=117 soils from an arable field in Germany, our goal was to investigate the prediction mechanisms and benefits of model fusion. Using MIR spectra or elemental concentrations derived from XRF spectra, partial least squares regression models went through a three-step training and testing process. Two high-level fusion and two sequential hybrid strategies were also tested. MIR outperformed XRF when it came to inorganic properties (RPIQV for clay=3.4, silt=3.0, and sand=1.8) in the field under investigation, while MIR was superior for organic properties (RPIQV for total OC=7.7 and N=5.0). For these properties, there was little to no improvement in accuracy with even the optimal fusion approach. The large number of elements with variable importance in the projection scores >1 (Fe, Ni, Si, Al, Mg, Mn, K, Pb (clay only), and Cr) and strong spearman correlations (0.57 rs 0.90) with clay and silt account for the high XRF accuracy for these materials. When comparing the best single spectrometer to the optimal fusion method, relative improvements in spectrally inactive properties based on indirect prediction mechanisms were marginal for pH (3.2% increase in RPIQV versus MIR alone), but more pronounced for labile OC (9.3% *versus* MIR) and CEC (12%). Performance was worse when a subpar spectrometer dominated in a fusion approach compared to the best single spectrometer.

Description

As potential tumor-selective treatment options, chemotherapeutics that specifically target hypoxic tumor regions are currently under investigation. Only a small amount of research has been done on BA's mode of action: Through caspase activation, induction of Reactive Oxygen Species (ROS), and DNA damage, the mitochondrial apoptosis pathway was activated by BA, thereby achieving its proapoptotic effects. Various mechanisms, including protein biosynthesis, ubiquitination, and proteasomal degradation, cell cycle regulation, signal transduction, Tran- and post V transcriptional regulation, and others, were found to be involved in BA's action in 60 NCI cell lines when compared to transcriptome data. Some transcription factors that encourage tumor growth, metastasis, angiogenesis, and drug resistance are also influenced by BA. In prostate cancer and oral squamous carcinoma cell lines, for instance, BA inhibited the oncogenic STAT3 and NF-B pathways and promoted p^{53} expression, which is responsible for reduced proliferation, enhanced apoptosis, and attenuated angiogenesis. Due to the fact that some studies indicated that the effectiveness of BA is independent of P^{53}, the significance of P^{53} for BA induced apoptosis is still unclear.

Conclusion

Trait variation Critical Thermal maximum (CT_{max}) we measure CT_{max} using the same method. As a measure of CT_{max}, we used the Loss of Righting Response (LRR). Three to four days prior to the experiments, 222 frogs were kept in a similar photoperiod regime in the field laboratory at 2200 m.a.s.l. (due to logistical issues, 15 individuals were kept for five days; however, CT_{max} did not differ between these individuals or those who had been acclimated for fewer days). We attempted to maintain similar ambient temperature conditions for all individuals (housed within a range of 16.5°C-18.5°C), despite the fact that we carried out our experiments in a location where fully controlled conditions are difficult to achieve, as von May explained. To prevent desiccation, frogs were placed in a plastic cup containing 1.5 mL of water and placed in a water bath. The water's initial temperature was 17°C and averaged 0.45°C per minute.

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