**Spectral Characterization of Coconut Scale Insect (CSI) from Fied Spectroradiometric Measurements and High-resolution Superspectral Imagery**

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**Abstract:** This paper examines the capability of optical remote sensing spectral techniques to detect the presence of CSI from field spectral measurements high resolution multispectral satellite imagery (HRMI) of coconut planted areas at least for the pilot sites examined. CSI has been observed to be ravaging coconut stands and plantations in Southern Luzon, Philippines and spreading at an alarming rate. The infestation results in coconut mortality and reduced productivity thereby threatening the coconut industry in the country. Remote sensing techniques are explored as a means to rapidly survey and monitor the CSI problem. Field spectral measurements were conducted to analyze the spectral features of coconuts leaves within different levels of infestation (low, moderate and severe), tree trunk and stand understory (e.g. grass). Worldview-2 images of coconut stands taken from two different dates more than a year apart covering the affected area were calibrated, co-registered and analyzed. Ground-based spectral signatures of coconuts of various degrees of infestation are fairly distinct and distinguishable in the 8-band Worldview-2 satellite imagery particularly pronounced in the NIR-1 and NIR-2 bands followed by Red Edge band. Ground truth data is consistent with the findings of satellite image analysis. The changes in these particular bands are also pronounced in the December 2012 versus January 2014 imagery. Spectral characteristics of affected coconut plants can be used as indicators to rapidly detect distribution, level and extent of infestation.

Keyword : coconut scale infestation, spectral signature,Worldview-2, spectroradiometer.