ABSTRACT

Waterhyacinth [Eichhornia crassipes (Mart.) Solms] is a nuisance aquatic weed worldwide that causes economic losses and impacts the aquatic environment. Successful control of this aquatic weed requires accurate monitoring. Remote sensing is an alternative to monitoring waterhyacinth populations and surrounding aquatic habitats. Hyperspectral remote sensing covers more spectral bands compared to multispectral methods. Pertinent features can be extracted from this higher dimensional feature space, allowing for higher accuracies on species differentiation. Studies were conducted in Lake Columbus, Columbus, MS between April 4 2004 and February 11 2005 to differentiate waterhyacinth and common rush (Juncus effusus L.) in natural areas by means of hyperspectral data. Both plants have been found growing in the same habitat where species differentiation may help on image classification. Hyperspectral data was collected monthly using a spectroradiometer, Analytical Spectral Device (ASD), Field Spec Pro®, model FR. The data was collected in 2151 spectral channels between 350 and 2500 nm with a 1.4 nm band width. The best spectral band used to distinguish waterhyacinth from common rush was selected using a spectro-temporal greedy search approach. The best spectral bands selected were 1347, 1348, 1349, and 1350 nm in the month of July, where, the combination of features results in an accuracy classification of 100%. These spectral bands clearly differentiated waterhyacinth from common rush during July, when both plants were found in flowering stage. Growth stage of these plants may have to be considered in remote sensing applications.