

Chapter 16

Remote Sensing of Biotic Stress in Crop Plants and Its Applications for Pest Management

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Abstract Remote sensing (RS) of biotic stress is based on the assumption that stress interferes with photosynthesis and physical structure of the plant at tissue and canopy level, and thus affects the absorption of light energy and alters the reflectance spectrum. Research into vegetative spectral reflectance can help us gain a better understanding of the physical, physiological and chemical processes in plants due to pest and disease attack and to detect the resulting biotic stress. This has important implications to effective pest management. This review provides an overview of detection of various biotic stresses in different crops using various RS platforms. Previous work pertaining to the use of RS technique for assessing pest and disease severity using different RS techniques is briefly summarized. The available sources of ground based, airborne and satellite sensors are presented along with various narrow band vegetation indices that could be used for characterizing biotic stress. Using relevant examples, the merits and demerits of various RS sensors and platforms for detection of pests and diseases are discussed. Pest surveillance programs such as field scoutings are often expensive, time consuming, laborious and prone to error. As remote sensing gives a synoptic view of the area in a non-destructive and non-invasive way, this technology could be effective and provide timely information on spatial variability of pest damage over a large area. Thus remote sensing can guide scouting efforts and crop protection advisory in a more precise and effective manner. With the recent advancements in the communication, aviation and space technology, there is a lot of potential for application of remote sensing technology in the field of pest management.

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