35 Remote Sensing to Detect Nitrogen Deficiency in Corn

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Nitrogen fertilizer mismanagement has detrimental economical and environmental consequences. A study was conducted to determine how well remote sensing techniques can identify N deficient areas in fields, which could lead to improved N management practices. Fertilizer N response trials involving multiple corn (Zea mays, L.) hybrids and soil types were investigated in central Nebraska during 1992 and 1993. Light reflectance measurements were made on clear d using a spectroradiometer, photometric cell, and aerial photography. Spectroradiometer results showed areas of the visible spectrum that were sensitive to crop N stress. An optical bandpass filter was used on the camera to isolate the green region of the spectrum for black and white photographs. The photometric cell provided the capability of detecting reflected light in a portion of the spectrum where N deficiencies could be detected. Negatives from standard color and black photographs were digitized and images were analyzed to identify areas of N stress. All light reflectance measurements taken from the corn canopy were capable of identifying N deficient plots, as verified with a chlorophyll meter. Both aerial photography and photometric sensors show promise as techniques for identifying N deficient areas. These methods could be valuable in identifying areas of a field that require special management practices.

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