TITLE:

The Use of a Hyperspectral Sensor to Monitor Cotton Stress at AG–CARES

AUTHORS:

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MATERIALS AND METHODS:

Image collected: June 29

RESULTS AND DISCUSSION:

At this point in the season, the wheat cover crop and soil factors dominated the images. During 2001, experiments conducted in the precision agriculture test area resulted in strips with phosphorus deficiency. The wheat was sensitive to this deficiency and displayed some symptoms in the next year. During the growing season, approximately 2 wks prior to the image, a nitrogen application was made to some strips in the field, but not others. Several days prior to obtaining the image, the first differential irrigation was made, with some strip plots at 100, 75, and 50 % evapotranspiration (ET). While this application would not have affected crop growth at the time of the image, the wetting of the soil was different, especially with the 50 % ET treatment. This treatment had consistently higher reflectance (lighter color) at all bands measured. However, the trends are the same with all of the water treatments, so the data from the 75 and 100 % ET was combined and is what is presented. The drier strips (ET = 50 %), had the same general relationships, but slight brighter values.

The soil phosphorus deficiencies were related to reflectance (Fig. 1A). Bands from 572 to 895 nm all correlated with the Meh2P measurements from the soil, with those areas low in phosphorus having the highest reflectance.

Soil nitrate levels from the first two feet were also correlated with % reflectance (Fig. 1B). Similarly to phosphorus, bands from 572 to 895 nm all correlated with soil nitrate. Nitrate levels in the soil were highest where the reflectance was brightest.

Fig. 1A

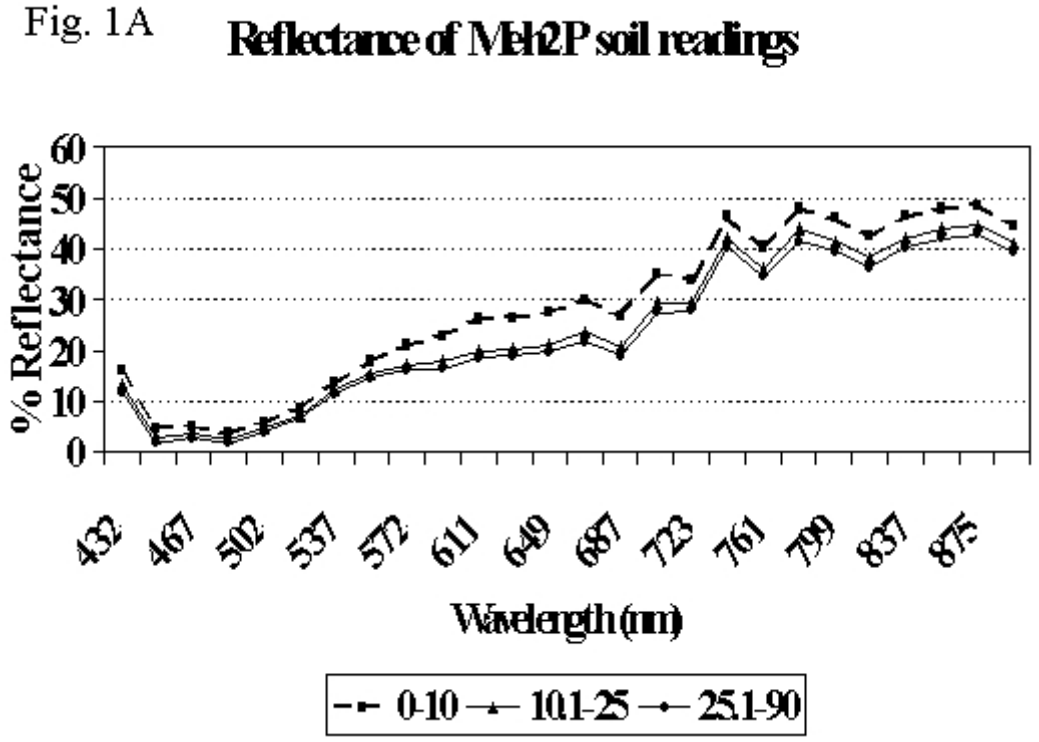
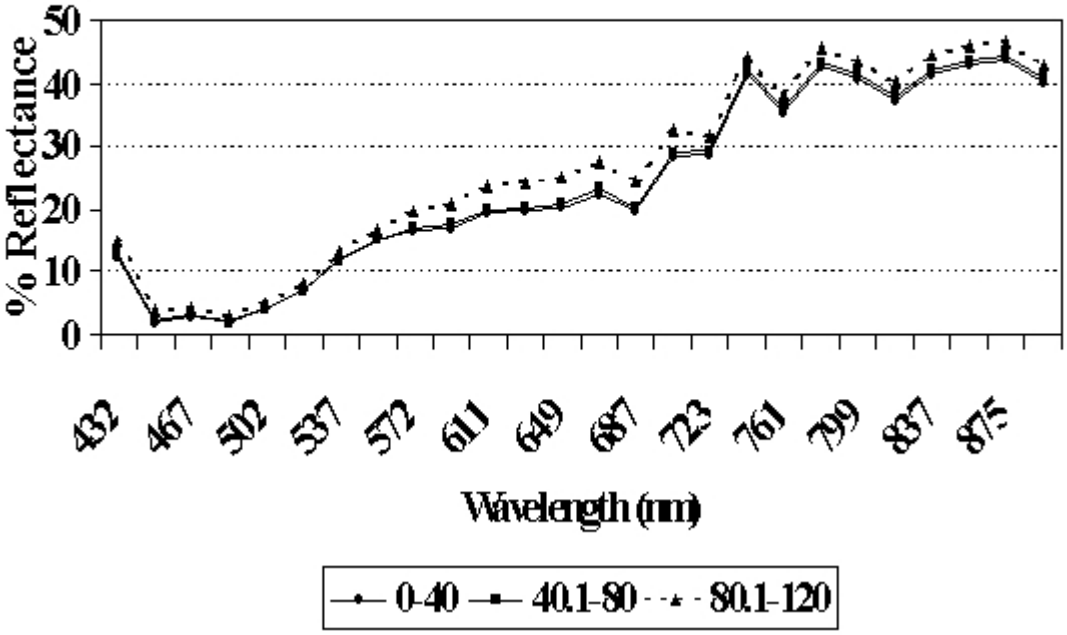

Reflectance of Mel2P soil readings
% Reflectance
60
50
40
30
20
10
0
432
467
502
537
572
611
649
687
723
761
799
837
875
Wavelength (nm)
0-10
10.1-25
25.1-90

Fig. 1B


Soil nitrate 0-24"
% Reflectance
50
40
30
20
10
0
432
467
502
537
572
611
649
687
723
761
799
837
875
Wavelength (nm)
0-40
40.1-80
80.1-120