

APPLICATION OF OPTICAL SENSORS FOR ESTIMATION OF THE CROP STATE OF WINTER WHEAT

S. V. Zhelezova

*Russian State Agrarian University – Moscow Timiryazev Agricultural Academ,
9 Timiryazevskaya St., Moscow, 127550
E-mail: soferrum@mail.ru*

The paper considers methodological aspects of surface monitoring of crops using three optical sensors: Yara N-testerTM, GreenSeeker[®] RT200 and Yara N-sensor[®] ALS. Monitoring of winter wheat crop has been carried out at the experimental field of the Precision agriculture center, Russian State Agrarian University – Moscow Timiryazev Agricultural Academy. Field measurements were conducted using the transect method. It was found that the vegetation indices determined by the optical sensors had considerable variability, which was due both to the natural variability of the crop state and to the crop management. For example, in May coefficients of variation of the indices at different spots of the field lay in the range from 8 to 57%, and were 22% on the average for the field. The instruments' readings depended on the size of the area covered by the crop and were varying significantly due to the different scale of averaging of individual measurements. During the whole vegetation season there was a strong direct correlation between the readings of the GreenSeeker[®] RT200 and Yara N-sensor[®] ALS. The correlation of the nitrogen status determined by the indications of the N-testerTM with vegetation indexes NDVI and BI in different parts of the field could be either positive or negative, depending on the plant density and availability of mineral nitrogen for individual plants. Recommendations for the application of nitrogen fertilizer at differentiated rates should be based on the estimation of nitrogen status according to the indicators of the spatially distributed NDVI of crops, rather than on the estimation of nitrogen status of an individual plant.

Keywords: optical sensors, NDVI, nitrogen status, spatial variability, winter wheat.

