

METHODOLOGICAL BASIS FOR STUDYING SPECTRAL CHARACTERISTICS OF THE PHYTOSANITARY CROPS STATE

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The paper considers the methodology of studying the spectral characteristics of the phytosanitary state of agricultural crops. It is based on the use of test sites for remote monitoring and permanent registration sites for terrestrial monitoring of the distribution and development of pests. At the same time, the test and permanent sites serve as standards with known parameters of phytosanitary state of crops. Based on them the subsequent decoding of images obtained with unmanned aerial vehicles and portable hand devices is carried out. Their use is the most accessible and least expensive way of remote and terrestrial collection of phytosanitary data, which are deciphered using special GIS programs. With their help it is possible to determine the individual spectral characteristics of a particular phytosanitary situation on a field. At the present time vegetation indices, such as NDVI, are most often used in the solution of phytosanitary problems. Statistical processing of the data showed a stable positive correlation of the NDVI with the canopy cover ($r = 0.33-0.91$) and less stable – with the number of weeds ($r = 0.06-0.81$). At the same time, with the decrease in the pest contamination, the strength of the connection between the indicated indices weakens. Correlation coefficients between the development of root rot on spring barley plants and the NDVI index were -0.36 and -0.38 (reliable) at the moment of registration in the tillering and booting phases. Narrow-zonal vegetation indices are more informative, but their wide application is limited by the high cost of portable devices and cameras.

Keywords: phytosanitary state, pests remote monitoring, test sites, precision agriculture.