METHODIC APPROACH TO AUTOMATIC DETECTION OF CARROT PLANTS INFECTED BY VIRAL DESEASES BASED ON RESULTS OF SPECTRAL SURVEY

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Summary. It is necessary for agricultural plants to inspect crops routinely and cull diseased plants, since they are a potential source of infection for the entire crop. The diagnosis of plant diseases should be fast and accessible with introduction of automatic methods to conduct the procedure. In a laboratory experiment with artificial lighting, the reflection spectra of healthy and virus-infected carrots leaves were compared. Model plants cultivated in plastic vessels were examined using the Ocean Insight "Flame" hyperspectrometer. Arrays of data without visualization (non-imaging data) were obtained based on the results of spectroscopy in the visible and near-infrared regions of the electromagnetic radiation spectrum. It was shown that the studied spectral characteristics of healthy and damaged by viral infection carrot leaves differed significantly. Spectral brightness reflection curves (spectral signatures) with individual shapes were created for healthy and diseased plants. The possibility of identifying diseased and healthy carrot plants using the studied spectral characteristics in the visible and near infrared range of light was shown. The main signs of viral infection are chlorotic lesions (discontinuous) and continuous chlorosis along the leaves with redness along the edges of the lower lobes of the leaves. Also, in diseased plants, the vegetation index NDVI is lower than in healthy plants. Further processing of the spectral survey results is aimed at determining the presence of carrot disease by spectral signatures in automatic mode using neural networks.

Key words: hyperspectrometer, spectral brightness coefficient, spectral signature, carrot virus, vegetation index NDVI, neural networks.