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PLANT HEALTH MANAGEMENT

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"Plant Health" is now an integrative paradigm, similar to the concepts of "Soil Health" and "Human Health". The evolution of integrated pest management (IPM) into the concept of Plant Health is a logical step in the development of phytosanitary science and practice, prompted by the numerous global challenges currently facing modern agriculture. This shift in focus reflects a fundamental change in approach, moving from the reactive control of harmful organisms to the proactive management of agroecosystem health. The FAO and WHO have officially incorporated Plant Health into the One Health Action Plan. The One Health concept recognises the interconnectedness of human, animal, plant and environmental health, with the health of agro-plant communities forming the cornerstone of stable crop production, food security and public health.

The Plant Health concept forms the basis of the "Farm to Fork" and "Green Deal" strategies, which currently advocate optimising pesticide use through decision support systems (DSS) and artificial intelligence (AI), transitioning to the precise application of plant protection products, minimising the environmental impact of pesticides and optimising protection systems. Finding the right balance among the appropriateness and effectiveness of pesticide use, its environmental impact, and the emergence of resistant biotypes of harmful organisms is key to creating high-quality food chains with low levels of pesticide residues and mycotoxins. Reducing excessive mineral fertiliser application and mitigating physiological stress in plants optimises nitrogen metabolism, reduces free asparagine accumulation in wheat grain, and decreases the content of the carcinogen acrylamide in final baked goods. Plant Health Management combines the principles of integrated pest management, biological control, environmental monitoring, digital solutions, AI, and sustainable agriculture. It is the foundational paradigm of 21st-century agricultural science and the cornerstone of food security. Implementing precision technologies for non-destructive testing is particularly important, including the use of portable spectrometers and

the analysis of spectral reflectance indices (such as MCARI, LCI, and GNDVI), as well as machine learning algorithms. This approach enables the selective detection of changes in ion and water status, as well as the early stages of pathogen development. It enables rapid assessment of nitrogen status, pigment content, and physiological stress levels in field crops, as well as identification of specific diseases and other factors.

Plant Health is a path already chosen by the world's leading countries. It is crucial that Ukraine does not remain on the sidelines of this transformation, but instead becomes an active participant and co-creator, leveraging its potential to develop sustainable, innovative, and competitive 21st-century agriculture.

Keywords: One Health Action Plan; Plant Health; Integrated Pest Management (IPM); Sustainable Agriculture; Food Security.

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