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RESEARCH AREA

Mycology, research on plant-associated fungi (non-pathogenic and pathogenic). Our work is mainly aimed at identifying, examining and understanding the diversity of fungi, their characteristics and functions. With a variety of methodologies (DNA-based identifications, comparative genomics, experimental approaches, different microscopies, chemical analysis) we try to understand the "hidden diversity" of fungi and its ecological role or application possibilities. The main areas of our work are the examination of the special metabolites produced by fungi and their applicability, the research of resistance to fungicides, the adaptation of fungi to their environments, the description of new fungal species, and the examination of the diversity of fungal (and other microbial) communities.

TECHNIQUES AVAILABLE IN THE LAB

- DNA-based identification (DNA extraction, various PCR techniques, primer design, diagnostic methods (CAPS, qPCR), community/environmental DNA extraction)
- different light microscopy (normal, fluorescent) techniques
- isolation of fungi from plant samples, maintenance and treatment of isolates
- experiments (effects of different environmental factors, plate-reader use, plant inoculations)
- statistical analyses
- analyses of DNA sequences, certain bioinformatic tools (the methods applied/learned depends on the project run)

SELECTED PUBLICATIONS

Knapp, D. G., Németh, J. B., Barry, K., Hainaut, M., Henrissat, B., Johnson, J., Kuo, A., Lim, J. H. P., Lipzen, A., Nolan, M., Ohm, R. A., Tamás, L., Grigoriev, I. V., Spatafora, J. W., Nagy, L. G., & Kovács, G. M. (2018). Comparative genomics provides insights into the lifestyle and reveals functional heterogeneity of dark septate endophytic fungi. *Sci Rep* 8(1): 6321.

Vági, P., Knapp, D. G., Kósa, A., Seress, D., Horváth, Á. N., & Kovács, G. M. (2014). Simultaneous specific in planta visualization of root-colonizing fungi using fluorescence in situ hybridization (FISH). *Mycorrhiza* 24(4): 259–266.

Pintye, A., Bacsó, R., & Kovács, G. M. (2024). Trans-kingdom fungal pathogens infecting both plants and humans, and the problem of azole fungicide resistance. *Front Microbiol* 15: 1354757.

Berek-Nagy, P. J., Tóth, G., Bősze, S., Horváth, L. B., Darcsi, A., Csíkos, S., Knapp, D. G., Kovács, G. M., & Boldizsár, I. (2021). The grass root endophytic fungus *Flavomyces fulophazii*: An abundant source of tetramic acid and chlorinated azaphilone derivatives. *Phytochemistry* 190: 112851.

Lukács, A. F., Herczeg, G., & Kovács, G. M. (2025). Effects of dark septate endophytic fungi on the performance of non-mycorrhizal cabbage plants under normal and low water conditions. *Front Microbiol* 16: 1593265.