

Parasexuality in the root endophytic fungus, *Glutinomyces brunneus*

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Purpose: Parasexual cycle has been hypothesized to play a key role in genetic exchange in some root endophytic fungi whose sexual structures have not been discovered. This manner of genetic process, however, has not been reported in these fungi including *Glutinomyces brunneus*, a member of the hyaloscyphaceous root endophytic fungi. Our aim was to examine parasexual ability of *G. brunneus*.

Methods: We developed mutant strains which were resistant to each of the two chemicals (Benomyl and Hygromycin B) by UV radiation and the Agrobacterium-mediated transformation. After 2 weeks of co-cultivation on 2% malt extract agar, the strains were transplanted onto new plates which contained both chemicals and dual-resistant strains were selectively cultivated.

Results: Significantly larger number of the dual-resistant strains were obtained when the co-cultivation was conducted between Benomyl- and Hygromycin B-resistant strains. All the analyzed dual-resistant strains had the Hygromycin B-resistant gene *hph* and the identical benomyl-resistant point mutation in the beta-tubulin gene, supporting transmission of the resistant genes between vegetative hyphae. Both the original and the dual-resistant strains had monokaryotic hyphae but 4 out of 8 dual-resistant strains contained both the wild and the mutated beta-tubulin genes. These results implied gradient loss of extra chromosomes of diploid nuclei after anastomosis and diploidization. This phenomenon was observed between the strains which shared the same precursors.

Conclusion: We concluded that the parasexual process was present in *G. brunneus*, but it was limited between genetically closely related individuals.