

Rungluk Kaewwichian 2013: Diversity of Phylloplane Yeasts and Elucidation of Their Biocontrol Mechanisms on Plant Pathogenic Fungi. Doctor of Philosophy (Microbiology), Major Field: Microbiology, Department of Microbiology. Thesis Advisor: Professor Savitree Limtong, Dr.Eng. 241 pages.

Eighty five samples of rice leaves, 65 samples of corn leaves and 94 samples of sugarcane leaves were collected from 28 districts in nine provinces of Thailand. Yeast isolation from phylloplane was carried out by an enrichment technique. A total of 441 yeast strains were collected from the 244 leaf samples including 156 yeast strains from rice leaves, 126 yeast strains from corn leaves and 159 yeast strains from sugarcane leaves. On the basis of the D1/D2 domain of the large subunit rRNA gene sequences analysis and phylogeny 155 yeast strains from rice leaves were identified as 32 known species in 18 genera belonging to Ascomycota i.e. *Candida*, *Clavispora*, *Cyberlindnera*, *Debaryomyces*, *Kodamaea*, *Lachancea*, *Metschnikowia*, *Meyerozyma*, *Millerozyma*, *Pichia*, *Wickerhamomyces*, *Yamadazyma* and *Yarrowia*, and Basidiomycota i.e. *Cryptococcus*, *Pseudozyma*, *Rhodotorula*, *Sporobolomyces* and *Trichosporon*, 123 strains from corn leaves were identified as 39 known species in 17 genera belonging to Ascomycota i.e. *Candida*, *Cyberlindnera*, *Geotrichum*, *Hanseniaspora*, *Kluyveromyces*, *Kodamaea*, *Meyerozyma*, *Millerozyma*, *Pichia*, *Torulaspora*, *Wickerhamomyces* and *Yamadazyma*, and Basidiomycota i.e. *Cryptococcus*, *Rhodospiridium*, *Rhodotorula*, *Sporobolomyces* and *Sporidiobolus*, and 146 strains from sugarcane leaves were identified as 36 known species in 19 genera belonging to Ascomycota i.e. *Candida*, *Cyberlindnera*, *Debaryomyces*, *Hanseniaspora*, *Kluyveromyces*, *Lachancea*, *Lodderomyces*, *Metschnikowia*, *Meyerozyma*, *Millerozyma*, *Pichia*, *Torulaspora* and *Wickerhamomyces*, and Basidiomycota i.e. *Hannaella*, *Cryptococcus*, *Rhodospiridium*, *Rhodotorula*, *Sporidiobolus* and *Sporobolomyces*. Eight strains were similar to undescribed species. Moreover, nine strains were found to represent six novel species and they were proposed on the basis of polyphasic taxonomy as *Metschnikowia saccharicola* sp. nov., *Metschnikowia lopburiensis* sp. nov., *Yamadazyma siamensis* sp. nov., *Yamadazyma phyllophila* sp. nov., *Wickerhamomyces siamensis* sp. nov. and *Nakazawaea siamensis* sp. nov. The prevalent species were *Rhodotorula taiwanensis*, *Meyerozyma caribbica* and *Candida tropicalis* but with low frequencies, 14.3, 12.0 and 10.9% of total strains, respectively. Individual leaf sample was generally accommodated by two yeast species (56.5, 60.0 and 48.9% of total sample of rice, corn and sugarcane phylloplane, respectively).

One hundred and forty eight strains in 40 species, four strains of an undescribed species and two strains of a novel species showed the capability to produce IAA cultivated in yeast extract peptone dextrose broth supplemented with 0.1% L-tryptophan. *Rhodospiridium fluviale* DMKU-RK253 produced the highest IAA concentration of 417.8 mg/L.

Only one strain namely *Torulaspora globosa* DMKU-RK547 significantly inhibited the three pathogenic fungi of rice and its biocontrol activity seem to be based on the production of siderophore and volatile compounds. The nutrient concentrations had significant different effect on fungal growth inhibition by *T. globosa* DMKU-RK547 and its living cells are necessary for the biological control activity.

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Thesis Advisor's signature