



**SPEECH INFORMATION (For Conference Program Book)**

Topic	Colonization compatibility with <i>Bacillus altitudinis</i> confers soybean seed rot resistance
Abstract	<p>Soybean red crown rot, caused by the soilborne fungal pathogen <i>Colonectria ilicicola</i>, has emerged as a growing global threat to soybean production, leading to root rot and crown lesion that ultimately reduce seed quality and yield. Since its initial detection in southern Taiwan in 2017, the disease has advanced northward, raising concern due to the pathogen's broad host range and the long-term survival of its microsclerotia in soil. Current management approaches—including seed fungicide treatments, crop rotation, soil sterilization, and delayed planting—offer only limited and inconsistent efficacy, and no standardized control strategy has yet been established in Taiwan. Recent studies have suggested that seed-associated microbiota may contribute to plant defence. In this study, we demonstrate that seed-associated bacteria play a role in conferring resistance to seed rot caused by <i>C. ilicicola</i>, although this protection does not extend to root rot. Through PacBio full-length 16S rRNA gene sequencing, we identified 14 amplicon sequence variants (ASVs) enriched in resistant soybean varieties, including two associated with <i>Bacillus altitudinis</i>. Isolates of <i>B. altitudinis</i> exhibited antagonistic activity against six soilborne fungal pathogens. When introduced to soybean seeds, these strains restored seed rot resistance in varieties that supported higher levels of bacterial colonization. Quantitative PCR analysis confirmed that bacterial persistence varied between resistant and susceptible varieties, with prolonged colonization observed on both apical shoots and roots in a resistant cultivar. These findings underscore the role of <i>B. altitudinis</i> in enhancing resistance to seed rot and highlight the importance of microbial compatibility and colonization dynamics in the development of biological control strategies. Collectively, current understanding presents an integrated strategy of fungicide seed treatments, beneficial microbial inoculants, resistance breeding, and agronomic practices as a comprehensive approach to managing red crown rot and sustaining soybean production in Taiwan.</p>

