

## 玉山青年學者 108 年度執行成果簡介

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### 中文摘要：

本計畫運用玉山青年學者經費與學校提供之開辦經費，建置光合作用實驗室並購置相關儀器設備，實驗室研究主題為針對臺灣分離出的溫泉紅藻獨特的光合作用系統結構，研究不同光度下的光合作用調節機制。第一年成效包括：與國內外學者合作進行紅藻基因體比較分析，釐清從臺灣分離出的溫泉紅藻在分類與親緣關係上的特殊性；分析不同光照環境下轉錄體的變化，得出高光抑制條件下添加葡萄糖可產生抗壞血酸避免光合作用的氧化受損，研究結果有助於評估溫泉紅藻應用於生質能開發的潛力。教學工作上已申請新開設植物學特色選修課程，致力培育光合作用基礎研究人才。受惠於玉山青年學者計畫，系級以至校級的研究教學資源發展益加蓬勃，跨校學術合作已見初步成果，亦有助於持續厚植基礎生科研究實力。

### 英文摘要：

The photosynthesis laboratory equipped with basic and specialized instruments has been set up with funding from the Yushan Young Scholar Project and funding allocated by NSYSU. Aiming at understanding the regulatory mechanism of photosynthesis of extremophilic red algae under different light conditions, the laboratory focuses on cyanidiophytes isolated in Taiwan and composed of unique photosynthetic apparatus. During the first year of this project, comparative genome analysis of cyanidiophytes was successfully conducted to figure out the controversial phylogenetic position of one strain isolated in Taiwan through cooperation among local and foreign scientists. Another major finding achieved via performing transcriptome analysis under different light conditions is that biosynthesis of ascorbic acid is a glucose-induced photoprotective process in high light; this result facilitates further evaluation and exploration of the potential of extremophilic red algae for biofuel applications. New undergraduate and postgraduate level specialized courses in botany were designed and approved to strengthen the education and training of future photosynthesis researchers. These accomplishments made with substantial support from the Yushan Young Scholar Project have contributed to the enhancement of the university's research and teaching resources and performance, the promotion of the academic collaboration across universities, and also the consolidation of the basic research in biological sciences.