

教育目標

本系以生物學科為基礎，結合作物栽培生理、品種改良及生物統計之知識與技術，培養學生活用專業知能，具備新品種開發與創新農業科技之能力，前瞻世界農糧之發展趨勢，解決人類面臨的農業問題。

課程規劃

本系設有大學部及碩、博士班，課程涵蓋遺傳與育種、作物栽培與生理、生物統計與試驗設計等三大領域，強調遺傳育種學之知識及作物改良之實作能力、作物生產栽培的實作能力、正確執行農業相關試驗、有效分析試驗資料與詮釋結果等訓練。培養學生具備現代化農業經營管理、良好協調合作精神及解決問題的基本能力，加強前瞻國際農產供需、自然資源開發利用、農業生態維護及農業相關科技發展之能力與技術。大學部課程著重基礎學科及專業科目之理論與實務之教學，碩士班及博士班課程則加強新興高科技之知識及生物技術專業領域之指導等。

主要研究領域

- ◆作物栽培生產技術之開發與利用：中草藥植物組織培養及量化生產；紫錐菊有機生產及產品開發；微波輔助萃取聖約翰草褪黑激素；建立作物生理參數、生長特性資料庫；開發植物工廠山葵生產技術。
- ◆有機栽培技術開發與生產：平地有機茶園建置、栽培管理技術開發及品種適應性研究。
- ◆作物逆境生理研究與應用：研究水稻對逆境之篩選指標與技術；小麥耐熱與耐旱品系篩選；探討淹水對水稻生理及NADPH氧化酶之影響；低溫與光週期對聖約翰草活性物質之影響。
- ◆植物荷爾蒙在作物生產之研究：離層酸對水稻葉片老化氮素代謝之影響；逆境下脯胺酸與多元胺代謝之研究；水稻懸浮細胞缺糖下之過氧化氫含量變化之探討。
- ◆作物分子遺傳技術之開發與應用：開發中草藥植物基源鑑定技術與分子標誌；探討薯蕷屬山藥的分子演化；辣椒雄不稔系統之建立及相關分子標誌之評估；利用水稻SSR分子標誌進行竹類親緣分析及標定米質的數量性狀基因座。
- ◆分子細胞遺傳研究：利用cDNA-AFLP標誌與分子



▲水稻突變庫包含多樣化米粒變異
Rice mutation pool contains wide variations in grain.



▲紫錐菊品種選育與產品開發
Variety breeding and product development.

細胞遺傳學技術探討玉米B染色體之功能、分子組成及演化。

- ◆中草藥作物之品種開發與利用：利用誘變進行丹蔘品種改良；利用輪迴選拔與花藥培養技術開發紫錐菊新品種；產學合作開發紫錐花膠囊、茶包及飲品等保健食品。
- ◆作物誘變與分子育種：利用疊氮化鈉誘變技術建立秈、梗稻突變庫；結合次世代定序技術進行突變基因分離、分子標誌開發及功能性基因體研究。
- ◆作物抗病之分子育種：利用分子育種技術與程水稻抗白葉枯病與稻熱病之新品種；刺角瓜抗性基因選殖及功能性分析；南瓜抗矮黃化嵌紋病毒分子標誌之建立。
- ◆生物統計在農業上之應用：作物生長發育模式分析；植物流行病學研究與預測；作物栽培量化風險性評估；利用遺傳演算法修正灰預測模式來預測農業產值；基改作物之基因漂流與安全性評估；即時定量PCR檢測基因改造作物量測不確定度評估。

教研成果

本系成立96年，畢業系友超過5,000人，分佈於各行各業表現優異，並擔任於公私立大專院校與中央農政與農業試驗改良場所場所長等要職，有2位系友曾任中興大學校長、6位系友獲選為傑出校友。臺灣農業的發展成果豐碩舉世聞名，本系系的貢獻良多，其中綠色革命所使用的半矮性基因，係來自系友林克明先生所育成著名的台中再來一號（Taichung Native, TN1）品種。台灣的水稻、花生、玉米、高粱等重要品種，絕大多數為本系系友所育成。本系教師兢兢業業於教學與研究，曾榮獲校內外多項學術獎項，如全國十大傑出農業專家、評鑑績優、產學績優、教學特優及興人師獎等。本系教師與國內外機構合作研究甚多，平均每年20餘件，經費約2千萬元。研究成果大多發表於國內外重要學術期刊、研討會、專書等，部分成果並榮獲國內外專利與植物品種權等，並有多項技術轉移與商品化應用等成果。

Mission

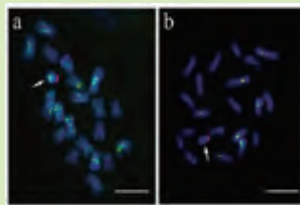
This undergraduate program is based on the biological sciences, and integrates the theory and practice of crop cultivation, crop improvement, and biostatistics. Our graduate program focuses on training students to acquire specialized skills and knowledge in the subjects of crop production and crop improvement.

Curriculum

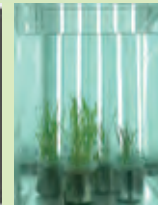
The department offers degrees of the Bachelor of Science (BS), Master of Science (MS), and Doctor of Philosophy (Ph.D.) in agronomy. The core curriculum contains three major areas: genetics and breeding, crop cultivation and physiology, and biostatistics to help students become familiarized with fundamental crop production, crop improvement, and data analysis. We teach students about natural resources, germplasm collection, preservation, and cultivation as the foundation of crop breeding. The department organizes crop science, crop physiology, and farm practice workshops for students to familiarize themselves with crops and nature. Through field investigations, sampling techniques, and data collection, students are taught the art and logic of data analysis and explanation. They are also taught to use their knowledge in response to the needs at the national level, in the development of new varieties, and innovative agricultural technology. Therefore, students graduate with various skills to practice crop production, crop improvement, and data analysis, and qualify for a wide range of agricultural production activities.

Core Research Topics

- ◆ **Crop cultivation techniques** : The development of mass propagation techniques for medicinal crops, melanin production from St. John's wort through a microwave-assisted method, and the development and establishment of parameters and a database for crop production.
- ◆ **Crop organic culture** : Mass propagation and organic production of purple Echinacea, establishment, technique development, and variety screening for tea production in a low-lying area.
- ◆ **Crop stress physiology research** : The study and development of parameters for the stress effect on rice, screening for heat- and drought-tolerant wheat variety, study of the effect of flooding on rice performance and NADPH oxidase activity, and study of the effect of proline and polyamine under stress conditions.



▲ 玉米B染色體之螢光原位雜交
FISH in maize using B specific transcripts



◀ 水稻淹水逆境研究
Study on the effect of rice submergence stress



▲ 平地有機茶之栽培生產與製造
Lowland organic tea cultivation, production and making



◀ 學生活動
Our students are active in extra-curriculum

- ◆ **Molecular genetics and cytogenetics** : The development of male sterility system and its correlated markers in hot pepper, and the study of the evolution of the maize B chromosome.
- ◆ **Crop mutagenesis and molecular breeding**: Establishment of mutation pools for japonica and indica rice varieties through mutagenesis, gene isolation, and marker development, and the functional study of mutants by using genomic technology.
- ◆ **Statistical applications in crop production**: Development of models for crop growth and production, epidemiology study and disease prediction, risk assessment in crop production, study of the gene flow and biosafety of transgenic crop, and study of the uncertainty detection of transgenic crops.

Achievements

Studies conducted by our faculty and alumni have resulted in substantial achievements and have made substantial contributions to advancing agriculture in Taiwan. Recent accomplishments include the development of rice mutation pools with a wide diversity and three rice varieties. We bred new Danshen (*Salvia miltiorrhiza*) varieties with highly active ingredients through mutagenesis and hybrid baby corn varieties. Through recurrent selection and anther culture, we developed a new *Echinacea purpurea* variety with high productivity. Through a marker-assisted selection to pyramid five genes, we developed the first rice variety with broad spectrum resistance to bacterial blight disease. Our genomic studies have identified virus resistance genes in *Cucumis metuliferus*, and mapped new quantitative trait loci resistant to bacterial blight disease in rice mutants.