

## 植物保護 Plant Protection

植物保護之工作目標為配合地區產業發展，加強作物病蟲害之非農藥防治技術、有害動物之生態研究、農業氣象資源規劃利用，並辦理作物病蟲害發生預測、診斷及防治施藥技術之指導。歷年研究已確立落花生葉斑病、大豆銹病、大豆紫斑病及柑桔潰瘍病之預測模式，並發展其適時防治的技術。水稻有機栽培時，防治縱捲葉蟲、螟蟲以蘇力菌32,000IU/mg每公頃施用一公斤，噴施2~3次效果甚佳。銀葉粉蝨之施藥配合其日、夜活動週期，以清晨進行防治較具效果。水芋種苗種植前，以免賴得等藥劑稀釋液浸漬後種植，可顯著減少軟腐病之發生。作物病蟲害非農藥防治法研究成果有利用遮光率70%之黑紗網遮光防治生薑葉燒病及白星病；利用大蒜抽出液防治甘藍黑斑病、洋香瓜蔓枯病、稻熱病、國蘭炭疽病等；噴施月橘抽出液可忌避胡瓜瓜實蠅於田間產卵，降低被害率；苦楝種子抽出液可防治為害甘藍之小菜蛾；肉桂油室內試驗證實可抑制多種真菌孢子發芽，正進行田間防治蔬菜病害中。

In order to strengthen local agriculture, the main research in plant protection has been focused on the ecology of crop pests, diseases and harmful animals, techniques of non-pesticide protection, and the utilization and exploitation of climatic resources. The prediction and diagnosis were conducted to help farmers to control crop pests and diseases in time. Forecasting models for peanut leafspot, soybean rust, soybean purple stain and citrus canker disease have recently been developed. Controlling the rice leaf folder and stem borer with *Bacillus thuringiensis* (32,000 IU/mg)



▲農業氣象觀測站設施

Agricultural climate station equipment.



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application is effective in the organic farming. Studies on the fluctuation of silver leaf whitefly during a day showed that the most effective chemical spraying period is in the morning. Treatment with benomyl and other chemicals will reduce taro seedling soft rot. Leaf blight and blister of zinger were controlled by 70% shading nets in the field. Garlic extract may control cabbage black leaf spot, melon gummy stem blight, rice blast and anthracnose disease in Cymbidium. Orange jasmine extract may prevent oviposition of the melon fly on cucumber and reduce its damage. Extract of neem seeds may protect cabbage from the damage by diamondback moth. Cinnamon oil can inhibit spore germination in many kinds of fungi in the laboratory, and its application for vegetable disease control is in progress in the field.



▲柑桔潰瘍病預測模式運用於田間  
A forecasting model to predict canker disease.



◀作物病蟲害診斷及處方服務  
Crop pest diagnosis service station.



►嚴重為害蔬菜、瓜果、豆類之銀葉粉虱  
Serious damages caused by silver leaf whiteflies.

▼水稻有機栽培以蘇力菌資材防治縱捲蟲、二化螟蟲  
Controlling the rice leaf folder and stem borer with *Bacillus thuringiensis* in organic farming.



▼國蘭薊馬以黏紙加苯乙醇誘引防治  
Sticky paper was more attractive with chemical scents to control the *Cymbidium* thrips.



▲水芋種苗種植前實施消毒處理  
Taro seedling treated with chemicals before planting.

### 土壤肥料 Soil and Fertilizer

本區耕地由於強酸性、強鹼性及淺薄土層而形成許多問題土壤，因此土壤肥料之工作目標為研究此種問題土壤所引起作物營養障礙之原因及防治技術，並辦理土壤及植物體分析，推薦合理施肥方法以提高施肥效果。近年來試驗研究之成果有：落花生缺鈣空莢可施用消石灰或矽酸爐渣以改正，文旦柚缺鎂則施用白雲石粉等均能有效矯正其營養障礙且提高品質與產量。文旦柚果園施用有機質肥料，每株16公斤，深度60公分者之品質與產量較佳。水稻收穫時將稻草切成片段並掩埋入土中，可改善地力，經五個期作連續處理後其稻穀產量比稻草移除區增產8%。落花生以菌根菌及根瘤菌拌種處理，在酸性土壤可增產18%，鹼性土壤約增產11%。具鐵錳積聚層之稻田，利用板犁深耕並種植綠肥，可使作物增產2~8%。露地栽培玫瑰每公頃每個月施用硫酸銨400公斤，過磷酸鈣450公斤及氯化鉀250公斤，切花之產量最高。九年生文旦以在開花期進行滴灌處理且每年每株施用硫酸鉀0.8公斤之處理最佳。在水旱及旱田輪作制度下經五年試驗，有機農法之作物產量及品質與化學法及折衷法相當。

In Hualien and Ilan areas, most soil is course deposit and is not very fertile with shallow topsoil. In addition, wide range of soil pH can be found here, thus, problem soil is very common. Major research has been emphasized on the understanding and the alleviation of crop nutritional disorders caused by the problem soil. The soil and plant analyses provided by researchers helped the farmers to fertilize efficiently. Unfilled peanut pods caused by calcium deficiency can be corrected by applying hydrated lime or silicate slag. In acidic soil, Wentan pomelos frequently showed the symptom of magnesium deficiency, which can be reduced by applying dolomite powder. Application of 16kg organic fertilizer per plant at a depth of 60cm is beneficial to the quality and yield of Wentan pomelos. After ploughing short pieces of rice straw into the field for five crop seasons, the rice yield was increased by 8%. Peanut seeds coated with mycorrhiza and rhizobia could increase pod



yield by 18% and 11% in calcareous and in acid soil, respectively. Paddy fields with iron and manganese accumulated layer can be corrected by deep plowing, and by planting green manure. The yield of rice crop was increased by 2~8% in this way.

Roses grown in the fields fertilized with 400kg ammonium sulfate, 450kg calcium superphosphate and 250kg potassium chloride per hectare each month had the highest yield of cut flowers. Coupling 0.8kg potassium sulfate per plant with drip irrigation obtained the best fruit quality in 9 years old Wentan pomelo orchard. After 5 years of continuous cropping, organic farming showed equal performance in crop yield and quality when compared with conventional cropping system.



▲文旦柚果園深層施用有機質肥料  
Deep placement of organic fertilizer for Wentan pomelo orchard



◀土壤及植物體營養診斷服務站  
Diagnosis station for soil and plant nutrition

▼稻草斬切後掩埋入土中可增加稻穀產量  
Incorporation of rice straw into the soil could increase the grain yield



▲文旦柚缺鎂之改良  
Alleviation of Wentan pomelo magnesium deficiency by applying dolomite powder

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- 落花生以菌根菌及根瘤菌拌種處理之生育與產量(左)較對照區(右)為佳  
Application of mycorrhiza and rhizobia to peanut crop.



- ◀ 九年生文旦在開花期進行滴灌處理同時施用硫酸鉀每年每株0.8公斤之處理最佳  
Coupling drip irrigation with 0.8kg  $K_2SO_4$  application per plant improved Wentan pomelo production in nine years old orchard.



- ▲ 在水旱及早田輪作制度下經五年試驗，有機農法之作物產量及品質與化學法及折衷法相當  
Organic farming showed same yield and quality comparing with conventional cropping system in 5 years.



### 農業機械 Agricultural Machinery

農業機械以研製適合本區農作物栽培且省工省時之農機具為目標，其工作重點為配合自動化設施之應用與輔導轄區蔬菜自動化育苗、水稻育苗及農機乾燥代耕中心。82年研發完成承載半拖曳型有機肥撒佈機，每公頃作業1.5小時，並經改良成多功能型有機肥撒佈機，除有機肥撒施功能外，又可配合化學肥料與農藥粒劑之撒施，並設有吊卸裝置，於85年已辦理技術轉移。83年研製完成手拉式鑽孔機，榮獲國家新型農機專利。85年研發完成單行及多行式蔬菜種子直播機，適合多種蔬菜種子直播。86年研製完成綜合型肥料施肥機，具備撒施有機肥與化學肥之功能，不但作業輕巧方便實用，而且一機兩用可減少農友投資之成本，已於86年辦理技術轉移。

To comply with the mechanized farming policy, the design of time and labor-saving agricultural machine is the goal of our agricultural machinery research. Furthermore, counseling concerning automation was given to the rice and vegetable nursery center, the grain drying center and dryland crop agrimachinery service stations. In 1993, an organic manure spreader pulled by a tractor was developed. Its capacity reaches



▲有機肥施肥機 Organic manure spreader

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1.5 hr/ha. It was further improved with a crane device in 1995. This spreader can apply organic manure, chemical fertilizer and pesticide simultaneously. The technology of this machine was transferred to the manufacturer in 1996. In 1994, the hand-pulled drill machine was developed. This machine was structured simply and can be operated easily. It was awarded the national monopoly. In 1996, the seeder for leafy vegetables was developed. In 1997, a spreader for granular or powdery organic manure and chemical fertilizer was developed and released. This machine can be operated easily and the cost was reduced because of its multi-function.



▲ 綜合型肥料撒佈機

Fertilizer spreader for granular or powdery organic manure



▲ 蔬菜直播機（多行式）

Seeder for leafy vegetable



▲ 手拉式鑽孔機

Hand-pulled drill machine

