全球重要农业文化遗产地菌物资源 ——"一区一馆五库"保育体系构建

Fungi resources of Globally Important Agricultural Heritage Systems

—Construction of the "One Area, One Museum, and Five Banks" Conservation System

▶ 概况 Introduction

2012年,庆元建立李玉院士专家工作站,李玉院士经多次实地考察后指出: "庆元是难得的菌物资源宝库,要建立'一区一馆五库'菌物资源保育体系,使得菌类能够得到保育,真正实现永续利用"。2019年,争取浙江省食用菌种质资源库项目支持,到2026年,拟投入2000万资金建设全球重要农业文化遗产地菌物资源"一区一馆五库"保育体系,即建立保育区、标本馆、种质资源库、菌体组织库、基因库、有效成分库、综合信息库。

In 2012, Academician Li Yu established an expert workstation in Qingyuan. After multiple on-site inspections, Academician Li Yu pointed out that "Qingyuan is a rare treasure trove of fungal resources. We need to establish a 'one district, one library, and five reservoirs' microbial resource conservation system, so that fungi can be protected and truly achieve sustainable utilization. Academician Li Yu was the first to propose that Qingyuan *Lentinula edodes* should be declared as an important global agricultural cultural heritage, create a pilgrimage site for "the ancestor of Lentinula edodes", and establish "one area, one museum, and five banks" of fungus resources. In 2019, the Zhejiang Edible Fungus Germplasm Resources Bank project was launched in Qingyuan, and by 2026, 20 million yuan will be invested for the construction of the "One Area, One Museum, and Five Banks" Conservation System, namely the conservation area, the specimen museum, the gene bank, active ingredient bank, living tissue library, the germplasm resource bank, and the comprehensive information database.

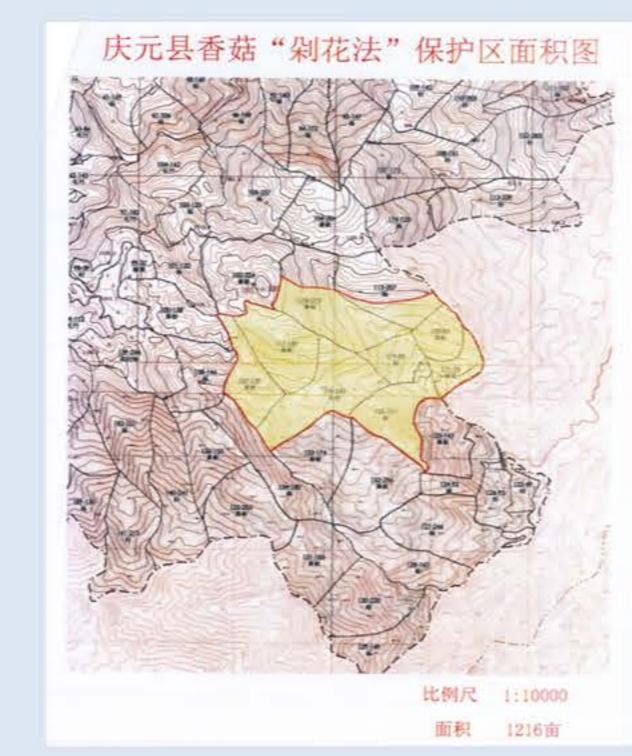
▶一区即保育区 One area is the conservation area

建立香菇传统剁花法保护区1216亩,采取封闭式保护管理,建立远程监控。建立野生香菇保育区600亩,保护香菇"古老"剁花法遗址、建立香菇剁花法种质资源收集点。建立黄靛牛肝菌保育区、林下促繁基地300亩,采取封闭式保护管理,开展种质资源保育、菌根苗培育、林下促繁增产等。

The conservation area of 200.32 acres was set for the traditional *Duo hua technique*, with enclosed protection management and remote monitoring. A conservation area of 98.84 acres for wild *Lentinula edodes* (shiitake) was established to protect the traditional traditional *Duo hua technique* site with an according germplasm resource area. A conservation area of 49.42 acres was established for boletus roseoflavus and its under-forest propagation base, with enclosed protection management, so as to facilitate germplasm resource conservation, mycorrhizal seedling cultivation, and production increase.



野生香菇种质资源保育区 Wild Lentinula edodes conservation areas



庆元县香菇"剁花法"保护区面积图 Area chart of Qingyuan County *Lentinula* edodes "Duo hua Method" Reserve

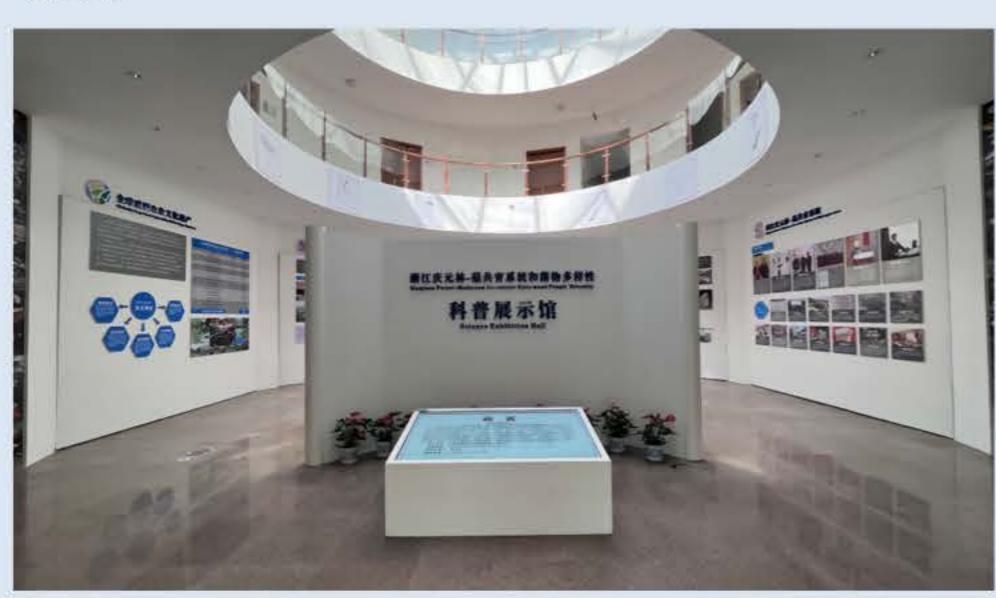


黄靛牛肝菌种质资源保育区 Boletus Roseoflavus Conservation Areas

▶一馆即标本馆 One museum is the specimen museum

标本馆建有科普展示馆和科研馆,主要收集保护遗产地的大型真菌资源。科普馆包括农业文化遗产展馆和菌物多样性展馆,菌物多样性展馆展示的是超低温冷冻干燥标本、液体标本,420份。科研馆保藏的是烘干标本,记录了标本的采集时间、地点、经纬度、海拔、生态照片等信息,馆藏标本3526份。

In the specimen museum, collected macrofungal resources from GlAHS are displayed in the science literacy section and the scientific research section. The former includes a section for agricultural heritage system and a section for fungal diversity which contains 420 ultra-low temperature freeze-dried specimens and liquid specimens. The scientific research section preserves 3526 dried specimens, with recorded information on when and where they were collected, latitude and longitude, altitude, ecological photographs and so on.



科普展示馆:农业文化遗产展馆
Science Literacy Section:Agricultural Heritage System



科研标本馆

Scientific Research Section on Specimens

ALLE CALLED TO THE PARTY OF TH

科普展示馆:菌物多样性展馆 Science Literacy Section on Fungal Diversity

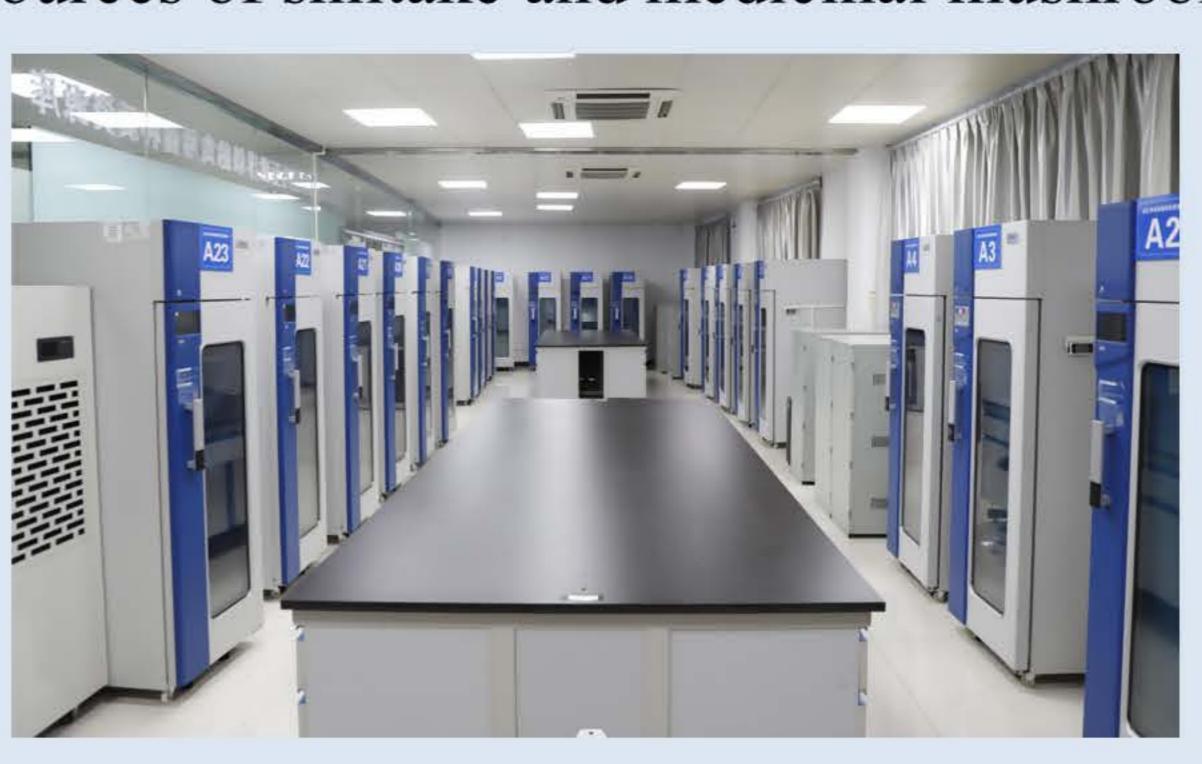


科研标本馆:部分标生态照片 Scientific Research Section on Specimens' Ecology Photos

▶五库:种质资源库 Five banks: Germplasm resource bank

▶构建了超低温液氮保藏和斜面低温保藏种质资源保藏库,收集保藏香菇、食药用菌等种质资源2015份。

An ultra-low temperature liquid nitrogen storage and beveling cryopreservation storage germplasm resource are used to preserve collected 2,015 copies of germplasm resources of shiitake and medicinal mushrooms.



斜面低温保藏库 Beveling Cryopreservation Storage



超低温液氮保藏库 Ultra-low Temperature Liquid Nitrogen Storage



部分野生香菇种质资源生态照片 Ecology of Some Wild Shiitake Germplasm Resources



部分野生食药用菌种质资源生态照片 Ecology of Some Wild Edible and Medicinal Mushroom Germplasm Resources

>五库: 菌体组织库

▶对采集的新鲜标本进行硅胶速干处理,形成干燥活体组织,保证其DNA不受破坏,保存于-80°C低温冰箱内。目前,收集保藏菌体组织1055份。

The silica gel drying is placed to make freshly collected specimens dried living tissues so as to prevent the DNA being damaged before storing in a low temperaturere firigerator at -80°C. The bank now contains 1055 conserved bacteriophage tissues.





▶五库: 基因库、有效成分库 Five banks: Gene bank and effective component bank

基因库主要包含种质资源的鉴定、ITS测序后构建系统发育树;全基因组序列的测序及分析;遗传多样性分析;核心种质资源性状评价;核心种质资源SSR分子标记。有效成分库主要是利用薄层色谱、GC-MS和UPLC-Triple-MS/MS分析鉴定重要食药用菌种质资源的活性成份,开展营养与功能活性成分分析评价,以建成野生重要食药用菌活性成分库。

The gene bank mainly includes identification of germplasm resources, construction of phylogenetic trees after ITS sequencing, sequencing and analysis of whole genome sequences, genetic diversity analysis, evaluation of core germplasm resource traits, and SSR molecular markers of core germplasm resources. The active ingredient library mainly uses thin-layer chromatography, GC-MS, and UPLC-Triple-MS/MS analysis to identify the active ingredients of important edible and medicinal mushroom germplasm resources, conduct nutritional and functional active ingredient analysis and evaluation, and build a wild important edible and medicinal mushroom active ingredient library.

▶五库:综合信息库 Five banks: Comprehensive information database 建成集标本馆、种质资源库、菌体组织库、基因库(ITS序列、全基因组序列),有效成分库(营养、活件成分等)的综合信息库。

Build a comprehensive value database consisting of a collection of forest resources, a germplasm resource library, a living tissue library (including Latin scientific name, collection time, collection location, photos, longitude, latitude, altitude), a gene library (ITS sequence, whole genome sequence, and an effective component library (nutrition, live component, etc.).



种质资源库信息管理系统 Integrated Information Base System Interface



种质资源分布图 Cermplasm Resource Distribution Map