Mycology in sustainable development: the case of *Pleurotus nebrodensis* (*Pleurotaceae*) from Sicily (southern Italy)

Giuseppe Venturella[1], Georgios Zervakis[2] & Francesco M. Raimondo[1]

1Department of Botany, University of Palermo, Via Archirafi 38, I-90123 Palermo (Italy)

2National Agricultural Research Foundation, Institute of Kalamata, Lakonikis 85, 24100 Kalamata (Greece)

- **SUSTAINABLE DEVELOPMENT IS THE MAINTENANCE OF ECONOMIC, SOCIAL AND INDUSTRIAL GROWTH WHILE PRESERVING THE INTEGRITY OF THE BIOSPHERE**

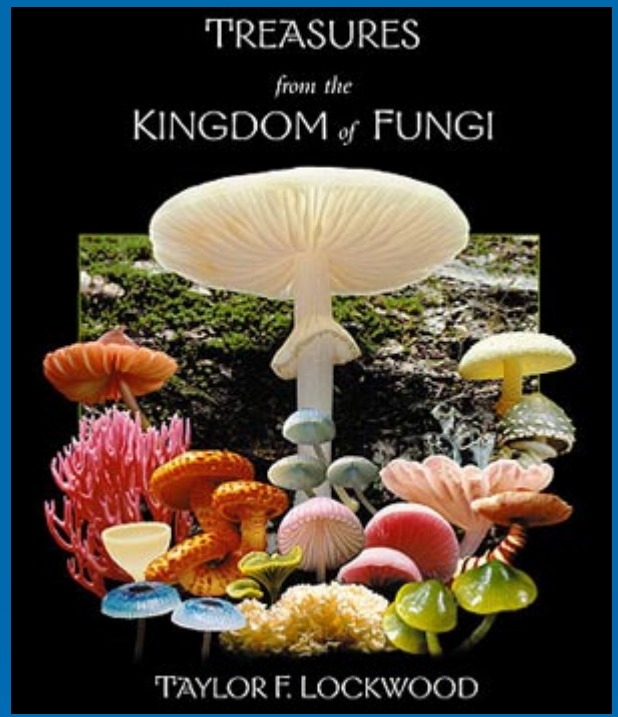
- **ECONOMIC PROGRESS BASED ON THE CURRENT MODEL OF RESOURCE DEPLETION CANNOT BE MAINTAINED INDEFINITELY BECAUSE THESE UTILIZED RESOURCES WILL EVENTUALLY BE EXHAUSTED**

- **URGENCY TO SEARCH FOR NEW ECONOMIC MODELS THAT ARE LESS DESTRUCTIVE TO THE BIOSPHERE AND PROMOTE SUSTAINABLE GROWTH AND DEVELOPMENT, WHETHER IN AGRICULTURAL, FOREST OR NATURAL ECOSYSTEMS**

It has been estimated that only 5-10% of fungi have been discovered and described (Hawksworth, 1991)

When a fungus is known to Science, it's biology often is not understood

When the biology of a fungus is understood in part, the full economic/ecologic value of that organism often is not fully appreciated or explored



FUNGI ARE THE MOST UNDER-EXPLOITED BIOLOGICAL GROUP AND POSSIBLY THE GROUP WITH THE LARGEST STORE OF POTENTIAL USES AND APPLICATIONS FOR SUSTAINABLE DEVELOPMENT

- FUNGI HAVE AN ESSENTIAL ROLE IN ENABLING AND ATTAINING SUSTAINABLE DEVELOPMENT
- FUNGI PROVIDES INNUMERABLE BENEFITS TO HUMANS (FOOD INDUSTRY AS EDIBLE MUSHROOMS AND AS ESSENTIAL ELEMENTS IN THE BREWING OF BEER, LEAVENING OF BREAD AND PRODUCTION OF CERTAIN CHEESE
- INDISPENSABLE ROLE OF FUNGI AS DECOMPOSERS AND NUTRIENT CYCLERS (SAPROPHYTES)
- A WIDE RANGE OF ENZYMES, TOXINS AND SECONDARY METABOLITES ARE PRODUCED BY FUNGI
- SYMBIOTIC ASSOCIATION
- PRODUCTION OF A NUMBER OF PHARMACEUTICAL PRODUCTS ESSENTIAL TO HUMAN AND ANIMAL HEALTH
- MEDIATION OF CARBON CYCLING, FACILITATING CARBON FIXATION AND RELEASE OF GREENHOUSE GASES

HIGHLY-PRIZED, ENDEMIC, AROMATIC AND EDIBLE MUSHROOM IN NORTH AMERICA

DECLINE IN NATURAL PRODUCTION

MYCORRHIZAL AND THEREFORE NOT EASILY CULTIVATED

PRODUCTION OF ANTIBIOTICS WHICH ELIMINATE OR LIMIT BACTERIAL GROWTH (A-PINENE)

IN INDIGENOUS COMMUNITIES FROM MEXICO HARVESTING IS A FAMILY ACTIVITY: IMMEDIATE CONSUMPTION OR SALE IN SMALL LOCAL MARKETS BY INDIVIDUALS WHO COLLECT 4-10 KG/DAY

THE USE OF MYCORRHIZAE FOR SUSTAINABLE GROWTH

DIRECT EFFECT ARE INCREASED PRODUCTIVITY OF FOOD, FORAGE, AND FIBER

THE MAJOR INSITUTIONS INVOLVED IN RESTORATION OR REHABILITATION INCLUDE GOVERNMENT LAND MANAGEMENT AGENCIES, PRIVATE CONSERVATION AGENCIES, MINING COMPANIES, TIMBER HARVEST COMPANIES, NURSERIES

FUNGAL BIOCONTROL OF WEEDS

THE USE OF FUNGI IN WEED BIOCONTROL HAS AN IMPORTANT ROLE IN THE ENLIGHTENED MANAGEMENT OF AGROECOSYSTEMS

EXAMPLES

THE USE OF PUCCINIA CHOMDRILLINA TO CONTROL CHONDRILLA JUNCEA IN AUSTRALIA AND USA

PHYTOPHTHORA PALMIVORA AGAINST MORRENIA ODORATA WITH THE COMMERCIAL NAME DEVINE IN USA

THE CULTIVATION OF EDIBLE FUNGI AS A SUSTAINABLE ALTERNATIVE IN TROPICAL REGIONS

- LIGNOCELLULOSIC WASTES
- CULTIVATION AND CONSUMPTION OF EDIBLE FUNGI ON LIGNOCELLULOSIC WASTES COULD AID IN IMPROVING THE DIET AND SOCIO-ECONOMIC STATUS OF A LARGE PERCENTAGE OF MEXICAN POPULATION
- MUSHROOM CULTIVATION IS A SUSTAINABLE AND DURABLE ALTERNATIVE BECAUSE IT INVOLVES A RATIONAL USE OF ORGANIC WASTES AND THE PRODUCTION OF FOOD WITHOUT DAMAGING THE ENVIRONMENT








Pleurotus nebrodensis

High level of exploitation

Occurrence in areas less than 100 km^2

Low number of mature individuals

Population size: less than 250 mature individuals

- IN THE MEDITERRANEAN REGION PLEUROTUS CULTIVATION IS RELATIVELY WIDESPREAD AND ACCOUNTS FOR ABOUT 10-20% OF THE TOTAL MUSHROOM PRODUCTION OF THE AREA, THE REST BEING ATTRIBUTED TO THE BUTTON MUSHROOM AGARICUS BISPORUS

- THE TRENDS INDICATE ASIGNIFICANT INCREASE IN THE FUTURE SINCE THE CULTIVATION OF PLEUROTUS SPECIES COULD BE READILY INTEGRATED WITHIN A SUSTAINABLE AGRICULTURAL PRODUCTION SCHEME

- Pleurotus mushrooms are widely accepted as a food of high organoleptic properties
- Pleurotus maintain relatively high prices for the grower in the market
- Spent substrate could be used for fodder
- The substrate could also be used as a plant fertilizer and soil conditioner