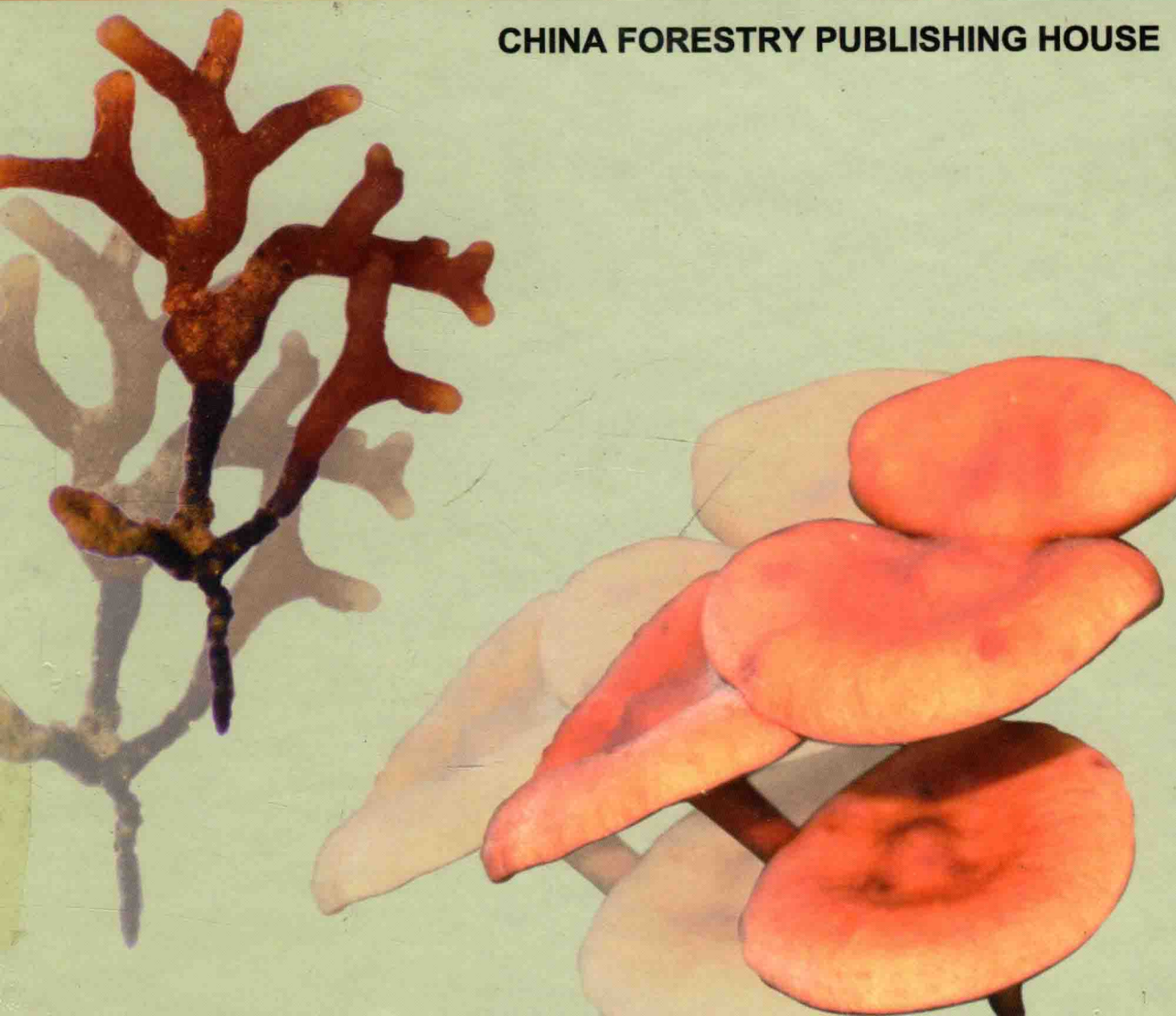




ECTOMYCORRHIZAL FUNGI IN CHINA

Lin, Xiaomin

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SUMMARY

The ectomycorrhizal fungi are the fungi that can form Ectomycorrhizas with roots of some trees, they are important bio-resources. Most forest trees are highly dependant on ectomycorrhizal fungi and in areas of poor soil, could possibly not even exist without them. Thus in forest management, if people do not manage for the ectomycorrhizal fungi, they could be damaging the trees. This book is an academic work on ectomycorrhizal fungi in China, in which 308 species, including 1906 synonyms, of ectomycorrhizal fungi found in China are detailed. The account of every species comprises scientific names, synonyms, citations of author and literature, morphological characteristics (macroscopic and microscopic features of fruiting body), ecological habits and distribution areas in China. Position of these fungi in classification were provided based on the research of molecular biology and ultrastructure, they belong to 43 genera, 20 families, 6 orders in Agaricomycetes of Basidiomycota. Besides, some species within Gomphidiaceae were also dealt with, they have been thought to be ectomycorrhizal fungi, however, there is now evidence that they are parasitic upon ectomycorrhizal boletes. 88 photos of ectomycorrhizal fungi or ectomycorrhizas are contributed in this book, and these photos were all taken by author Lin, xiaomin. This book has an important reference value for further relevant research, protection and sustainable utilization of ectomycorrhizal fungus resources.

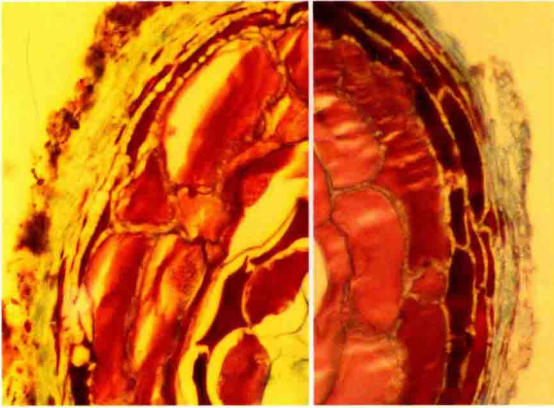


Figure 01. Cross section of *Pinus tabulaeformis* Ectomycorrhiza (abbreviated as ECM) with a thick mantle(hyphal sheath) outside the short root and Hartig net hyphae enveloping cortex cells.



Figure 02. Hyphae that formed Hartig nets of a *Pinus tabulaeformis* ECM.

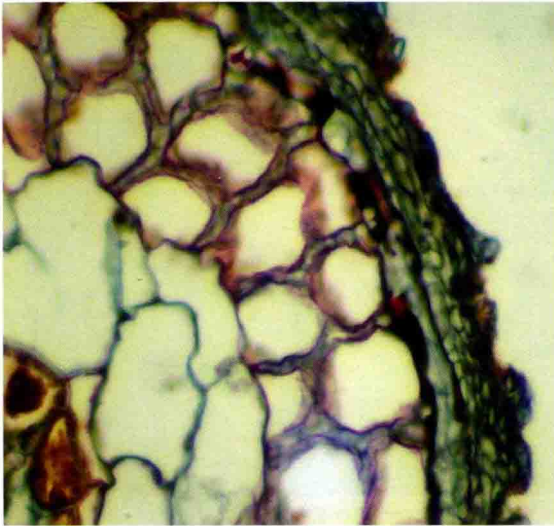


Figure 03. Cross section of *Quercus variabilis* (Oriental oak) ECM with a thick mantle (hyphal sheath) outside the short root and Hartig net hyphae enveloping cortex cells.

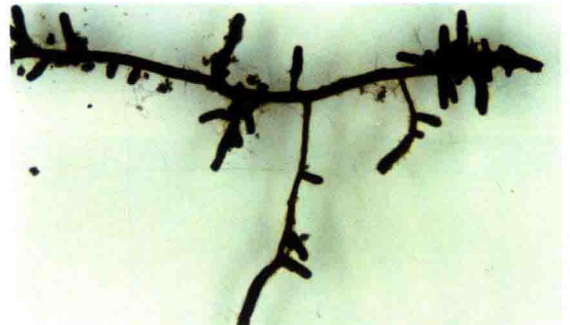


Figure 04. ECM short roots of *Quercus variabilis* (Oriental oak, an angiosperm tree) with black mantle (hyphal sheath).



Figure 06. ECM short roots of *Quercus aliena* (Oriental white oak, an angiosperm tree) with black mantle (hypha sheath).

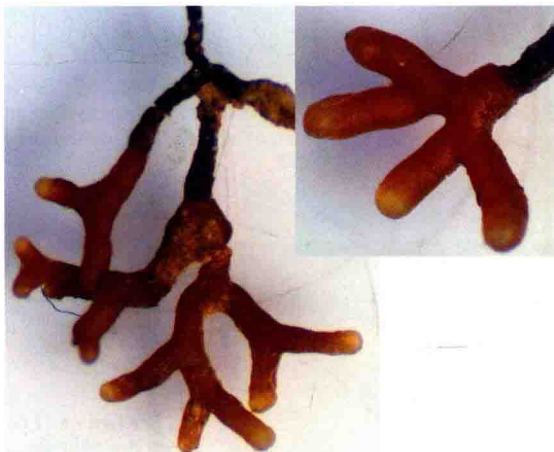


Figure 05. Ectomycorrhiza ECM short roots of *Pinus tabulaeformis* (Chinese Pine, a gymnosperm tree) with yellowish-brown mantle(hyphal sheath).

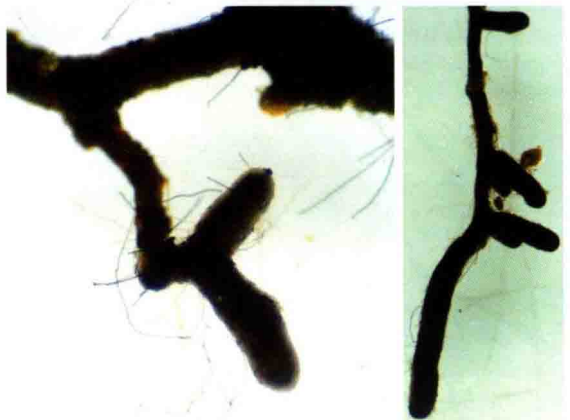


Figure 07. ECM short roots of *Castanea mollissima* (Chinese chestnut, an angiosperm tree) with black mantle (hyphal sheath).

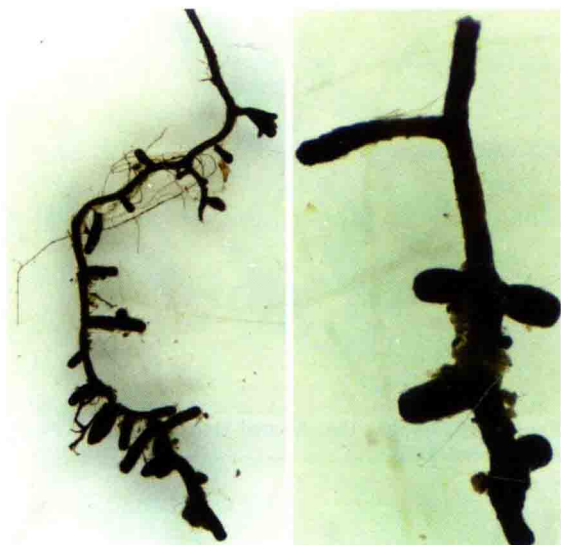


Figure 08. ECM short roots of *Quercus acutissima* (Sawtooth oak, an angiosperm tree) with black mantle (hyphal sheath) and extraradical hyphae.

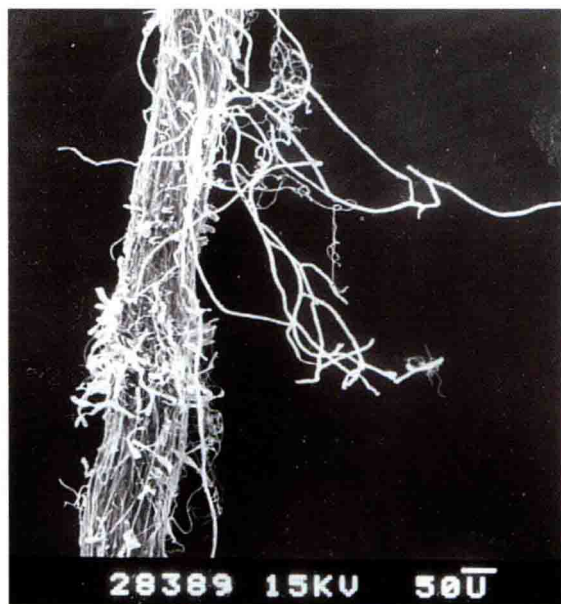


Figure 11. SEM (Scanning electron microscope) image of extraradical hyphae on a *Quercus variabilis* (Oriental oak) ECM.

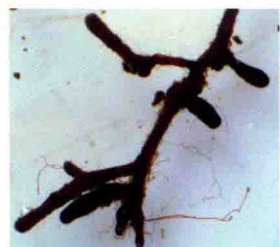


Figure 14. Extraradical hyphae on *Quercus aliena* (Oriental white oak) ECM.

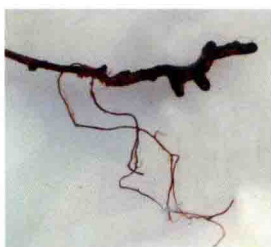


Figure 15. Extraradical hyphae connecting with *Quercus variabilis* (Oriental oak) ECM.



Figure 09. Extraradical hyphae on *Pinus tabulaeformis* (Chinese Pine) ECM.



Figure 10. Extraradical hyphae on *Pinus massoniana* (Chinese red pine) ECM.



Figure 12. Extraradical hyphae on mantle (hyphal sheath) of *Quercus variabilis* (Oriental oak) ECM.



Figure 13. Extraradical hyphae on *Quercus variabilis* (Oriental oak) ECM.



Figure 16. Fruiting bodies of *Amanita caesarea* (an ECM fungus).



Figure 17. Gills of *Amanita caesarea* (an ECM fungus), some of them are forked, and some are short gills that do not extend fully from the cap edge to the stem.



Figure 18. A fruiting body of *Amanita fuliginea* (an ECM fungus).



Figure 19. Fruiting bodies of *Amanita fulva* (an ECM fungus).



Figure 20. Fruiting bodies of *Amanita gemmata* (an ECM fungus).



Figure 21. A fruiting body of *Amanita hemibapha* (an ECM fungus).



Figure 22. Gills of *Amanita hemibapha* (an ECM fungus), some of them are forked, and some are short gills that do not extend fully from the cap edge to the stem.



Figure 23. A fruiting body of *Amanita longistriata* (an ECM fungus).

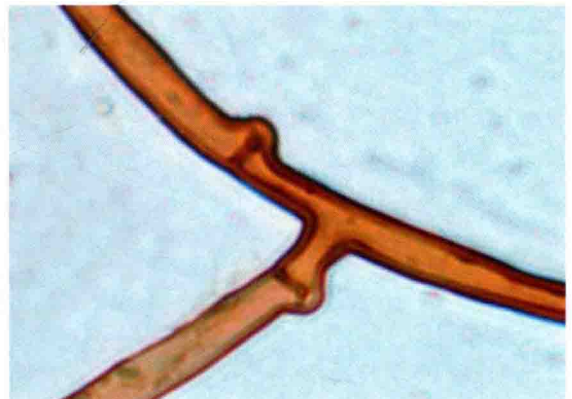


Figure 24. Clamp connections on extraradical hypha of *Amanita onusta* (an ECM fungus) on the roots of a *Quercus variabilis* (Oriental oak).



Figure 25. Fruiting bodies of *Amanita solitaria* (an ECM fungus).



Figure 26. A fruiting body of *Amanita vaginata* (an ECM fungus).



Figure 27. Fruiting bodies of *Amanita verna* (an ECM fungus).



Figure 28. Fruiting bodies of *Laccaria bicolor* (an ECM fungus).



Figure 29. Fruiting bodies of *Laccaria laccata* (an ECM fungus).



Figure 30. Cap upper surface of *Tricholoma equestre* (an ECM fungus).



Figure 31. Cap undersurface and stem of *Tricholoma equestre* (an ECM fungus).



Figure 32. Fruiting bodies of *Boletellus ananas* (an ECM fungus).



Figure 33. A fruiting body of *Boletus pulverulentus* (an ECM fungus).



Figure 34. Fruiting bodies of *Leccinum holopus* (an ECM fungus).



Figure 35. A fruiting body of *Retiboletus griseus* (an ECM fungus).



Figure 36. A fruiting body of *Strobilomyces confusus* (an ECM fungus).



Figure 37. A fruiting body of *Strobilomyces strobilaceus* (an ECM fungus).



Figure 38. Fruiting bodies of *Gyroporus purpurinus* (an ECM fungus).



Figure 39. A fruiting body of *Pisolithus arhizus* (an ECM fungus)(1).



Figure 40. A fruiting body of *Pisolithus arhizus* (an ECM fungus) (2).



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Figure 42. Spore packages of *Pisolithus arhizus* (an ECM fungus).



Figure 43. Basidiospores of *Pisolithus arhizus* (an ECM fungus).



Figure 44. Fruiting bodies of *Scleroderma verrucosum* (an ECM fungus).



Figure 45. Fruiting bodies of *Scleroderma verrucosum* (an ECM fungus), three of which were cut out, their inside exposed.

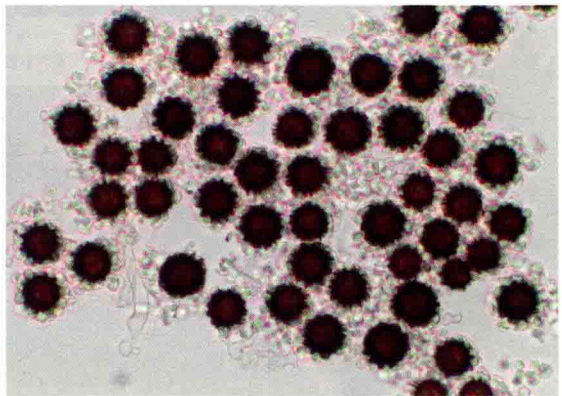


Figure 46. Basidiospores of *Scleroderma verrucosum* (an ECM fungus).

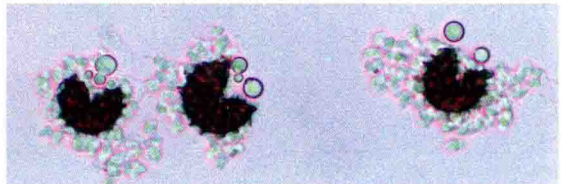


Figure 47. Fresh and broken basidiospores of *Scleroderma verrucosum* (an ECM fungus).



Figure 48. Fruiting bodies of *Suillus cavipes* (an ECM fungus).



Figure 49. Cap upper surface of *Suillus granulatus* (an ECM fungus).



Figure 50. Fruiting bodies of *Suillus grevillei* (an ECM fungus).



Figure 52. Cap undersurface and stem of *Suillus spraguei* (an ECM fungus).

Figure 51. Fruiting bodies of *Suillus placidus* (an ECM fungus).



Figure 53. Fruiting bodies of *Suillus tomentosus* (an ECM fungus).

Figure 54. Fruiting bodies of *Cantharellus subalbidus* (an ECM fungus).



Figure 55. A fruiting body of *Turbinellus floccosus* (an ECM fungus).



Figure 56. Fruiting bodies of *Lactarius camphoratus* (an ECM fungus).



Figure 57. A fruiting body of *Lactarius controversus* (an ECM fungus).



Figure 58. A fruiting body of *Lactarius pallidus* (an ECM fungus).



Figure 60. Fruiting bodies of *Lactarius piperatus* (an ECM fungus).



Figure 59. Pleurocystidia (cystidia on the face of a gill) of *Lactarius pallidus* (an ECM fungus).



Figure 61. Fruiting bodies of *Lactarius piperatus* (an ECM fungus) growing scattered or gregariously on the ground in deciduous forests.



Figure 62. A fruiting body of *Lactarius torminosus* (an ECM fungus).



Figure 63. Fruiting bodies of *Lactarius volemus* (an ECM fungus).



Figure 65. Fruiting bodies of *Russula claroflava* (an ECM fungus).



Figure 64. Cheilocystidia (cystidia on the edge of a gill) of *Lactarius volemus* (an ECM fungus).



Figure 66. A fruiting body of *Russula delica* (an ECM fungus).

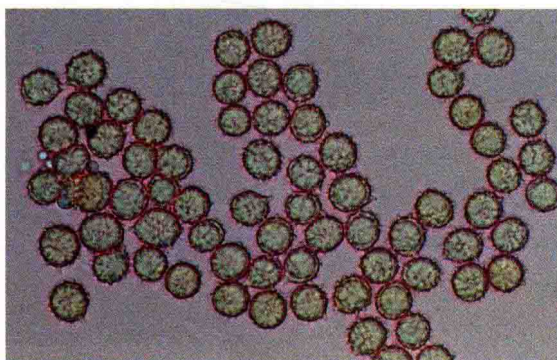


Figure 67. Basidiospores of *Russula densifolia* (an ECM fungus).

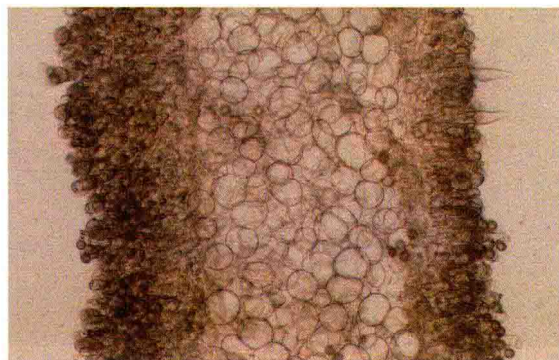


Figure 68. Sphaerocysts (spherical cells) in the trama *Russula densifolia* (an ECM fungus).



Figure 69. Fruiting bodies of *Russula emetica* (an ECM fungus).



Figure 70. A fruiting body of *Russula pectinatoides* (an ECM fungus).



Figure 71. Fruiting bodies of *Russula virescens* (an ECM fungus).

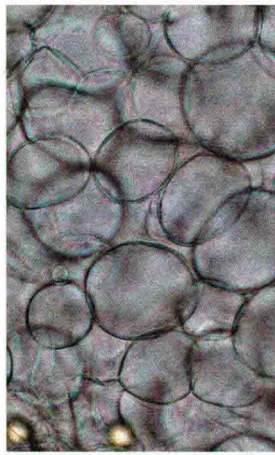


Figure 72. Sphaerocyst cytoarchitecture in cap flesh of *Russula virescens* (an ECM fungus).

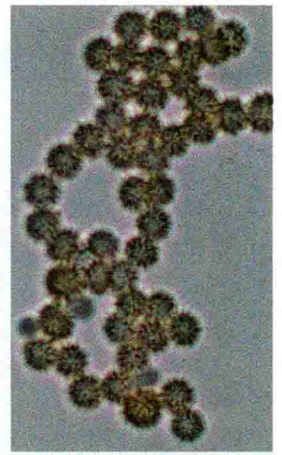


Figure 73. Basidiospores of *Russula virescens* (an ECM fungus).



Figure 74. Fruiting bodies of *Russula xerampelina* (an ECM fungus).



Figure 75. Pleurocystidia (cystidia on the face of a gill) of *Russula xerampelina* (an ECM fungus).



Figure 76. A fruiting body of *Hydnum repandum* (an ECM fungus).

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