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Editorial
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Special Issue: Fungal Evolution, in honour of the Academician Professor Yu Li's 80th Birthday

Hyde Kevin David[1], Tolgor Bau[2], Yongping Fu[2], Liangcheng Chen[3], Shijun Xiao[2]

[1]Center of Excellence in Fungal Research, Mae Fah Luang University, Chiang Rai 57100, Thailand
[2]International Cooperation Research Center of China for New Germplasm Breeding of Edible Mushrooms, Jilin Agricultural University, Changchun 130118, China
[3]Sylvan International Biotechnology Co., Ltd., Huai'an 223001, China

Figure 1 – Professor Yu Li with *Ganoderma sichuanense* in December, 2020

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Professor Yu Li is a mycologist, at Jilin Agricultural University, an academician of the Chinese Academy of Engineering and foreign academician of the Russian Academy of Sciences, and the present President of the International Medicinal Mushrooms Conference. Li has been a scientist and educator of mycological science and engineering for over fifty years. Under his leadership, a full level educational system in mycology with undergraduate to post-doctoral students has been established. In China, he is honoured as the "Founder of the Discipline of Mycology, Explorer in the Field of Edible Fungi Science and Research, as well as a Leader of the Edible Fungi Industry".

Professor Yu Li was the first Chinese nomenclator of Myxomycetes. He studied the systematics of fungal resources from typical Chinese ecosystems and with in-depth investigations, authored 130 new species and recorded over 430 myxomycetes species - 43% of known species in the world. He built a fungal herbarium and germplasm bank with representativeness and global influence.

Professor Li conducted germplasm innovation research on edible and medicinal fungi, using genomics, phenomics and molecular biology. He constructed an integrated omics database (MushDB, http://mushroomomics.com) covering ~90% of the worldwide commercially cultivated mushroom species. He developed new germplasm for over 11,000 strains, such as *Auricularia heimuer*, *Pleurotus ostreatus* and *Ganoderma sichuanense*, and successfully bred 45 new cultivars with intellectual properties granted. With the aid from Li and his team, the farmers in China cultivated mushrooms with new cultivars and cultivation technologies increased their annual income by 30 billion yuan.

Professor Li has been making efforts to promote the value of edible fungi as a staple food to alleviate food shortages and develop high value-added products by successfully developing over 130 fungi-based functional foods and new materials after a series of research. He built a platform for basic analysis and purification of fungal substances, constructed a high-throughput system for screening their activities based on cell research, as well as a system for evaluating their *in vivo* effect on 28 stimulated human diseases. Through these efforts, functional activities and mechanisms of 27 fungi have been verified.

This Special Issue is dedicated to Professor Yu Li on the occasion of his 80th birthday in 2023, commemorating his outstanding contributions and achievements in mycology. It includes eight papers on Fungal Evolution. Ryberg and co-authors have investigated and presented results on the evolution of ectomycorrhizal fungi, while Houdanon and co-authors have presented results on the relationships of tropical African ectomycorrhizal fungi. Ling and co-authors report on the evolutionary relationship and a novel method of efficient identification of *Lentinula edodes* cultivars, while Fu and co-authors show how large-scale genome investigations reveal insights into the domestication of cultivated mushrooms. Chen and co-authors show how comparative genomics provides new insights into the evolution of *Colletotrichum*, while Nuñez Otaño and co-authors redefine fossil *Tetraploa* and discuss the potential contribution of dark pigments for the preservation of its spores in the fossil record. Zeng and co-authors have studied the evolutionary relationships and allied species of Pyronemataceae, and used this data to segregate a novel family Pyropyxidaceae. Finally, Wei and co-authors have studied the diversity, molecular dating and ancestral character state reconstruction of entomopathogenic fungi in Hypocreales.

10 representative publications authored by Professor Yu Li

1. Fu YP; Dai YT; Chethana KWT; Li ZH; Sun L; Li CT; Yu HL; Yang RH; Tan Q; Bao DP; Deng YJ; Wang SX; Wang YF; Tian FH; Qi LL; Shu LL; Jia PS; Chen LC; Chen MY; Hu QX; Tan H; Song TT; Zhang ZW; Bonito G; Zervakis GI; Xiao SJ*; Hyde KD*; Li Y*; Yuan XH*. Large-scale genome investigations reveal insights into domestication of cultivated mushrooms. Mycosphere 2022, 13(2): 86-133.
2. Hu JJ; Song LR; Tuo YL; Zhao GP; Yue L; Zhang B*; Li Y*. Multiple evidences reveal new species and a new record of smelly *Gymnopus* (Agaricales, Omphalotaceae) from China. Frontiers in Microbiolgy 2022, 6(13): 968617.

3. Hu JJ; Zhao GP; Tuo YL; Rao G; Zhang ZH; Qi ZX; Yue L; Liu YJ; Zhang T; Li Y*; Zhang B*. Morphological and molecular evidence reveal eight new species of *Gymnopus* from Northeast China. Journal of Fungi 2022, 8(4): 349.
4. Liu ZH; Zhao YT; Sossah FL; Okorley BA; Amoako DG; Liu PB; Sheng HY; Li D*; Li Y*. Characterization, pathogenicity, phylogeny, and comparative genomic analysis of *Pseudomonas tolaasii* strains isolated from various mushrooms in China. Phytopathology 2022, 112(3): 521–534.
5. Wan XL; Jin X; Wu XM; Yang X; Lin DM; Li CT; Fu YP; Liu Y; Liu XZ; Lv JH; Gontcharov AA; Yang HM; Wang Q*; Li Y*. Structural characterisation and antitumor activity against non-small cell lung cancer of polysaccharides from *Sanghuangporus vaninii.* Carbohydrate Polymers 2022, 15(276): 118798.
6. Zou Y; Hou JG; Guo SN; Li CT; Li Z; Stephenson SL; Pavlov I; Liu P*; Li Y*. Diversity of dictyostelid cellular slime molds, including two species new to science, in forest soils of Changbai Mountain, China. Microbiology 2022, 10(5): 2–22.
7. Hu WJ; Song MK; Wang CY; Guo Z; Li Y*; Wang D*. Structural characterization of polysaccharide purified from *Hericium erinaceus* fermented mycelium and its pharmacological basis for application in Alzheimer's disease: Oxidative stress related calcium homeostasis. International Journal of Biological Macromolecule 2021, 193(A): 358–369.
8. Lv JH; Yao L; Zhang JX; Wang LA; Zhang J; Wang YP; Xiao SY; Li CT*; Li Y*. Novel 2,5-diarylcyclopentenone derivatives from the wild edible mushroom *Paxillus involutus* and their antioxidant activities. Journal of Agricultural and Food Chemistry 2021, 69(17): 5040–5048.
9. Liu P; Zhang SH; Zou Y; Li Z; Stephenson SL; Li Y*. Distribution and ecology of dictyostelids in China. Fungal Biology Reviews 2020, 34(4): 170–177.
10. Wang D; Jiang X; Teng SS; Zhang YQ; Liu Y; Li X*; Li Y*. The antidiabetic and antinephritic activities of *Auricularia cornea* (an albino mutant strain) via modulation of oxidative stress in the db/db mice. Frontiers in Immunology 2019, 8(10): 1039.

100 New species published by Professor Yu Li

1. *Arcyria galericulata* B. Zhang & Y. Li
2. *Arcyria galericulata* B. Zhang & Y. Li
3. *Calonema gansuence* B. Zhang & Y. Li
4. *Colletotrichum neorubicola* Yu Li, J. Gao & L.P. Liu
5. *Comatricha clavicolumella* B. Zhang & Yu Li
6. *Comatricha macrospora* B. Zhang & Yu Li
7. *Coprinopsis jilinensis* G. Rao, H.N. Zhao, B. Zhang & Y. Li
8. *Coprinopsis pusilla* G. Rao, B. Zhang & Y. Li
9. *Cordyceps changbaiensis* J.J. Hu, B. Zhang & Y. Li
10. *Cordyceps changchunensis* J.J. Hu, B. Zhang & Y. Li
11. *Cordyceps jingyuetanensisv* J.J. Hu, B. Zhang & Y. Li
12. *Cortinarius khinganensis* M.L. Xie, T.Z. Wei & Y. Li
13. *Cortinarius laccariphyllus* Y. Li & M.L. Xie
14. *Cortinarius neobalaustinus* M.L. Xie, T.Z. Wei & Y. Li
15. *Cortinarius neotorvus* Y. Li, M.L. Xie & T.Z. Wei
16. *Cortinarius pseudocamphoratus* M.L. Xie, T.Z. Wei & Y. Li
17. *Cortinarius subcaesiobrunneus* Y. Li & M.L. Xie
18. *Cortinarius subfuscoperonatus* Y. Li & M.L. Xie
19. *Cortinarius subnymphatus* M.L. Xie, T.Z. Wei & Y. Li
20. *Cortinarius subsalor* M.L. Xie, T.Z. Wei & Y. Li
21. *Cortinarius tibeticisalor* M.L. Xie, T.Z. Wei & Y. Li
22. *Cortinarius wuliangshanensis* M.L. Xie, T.Z. Wei & Y. Li
23. *Cortinarius yanjiensis* M.L. Xie, T.Z. Wei & Y. Li
24. *Craterellus connatus* G.P. Zhao, J.J. Hu, B. Zhang & Y. Li

25. *Craterellus striatus* G.P. Zhao, J.J. Hu, B. Zhang & Y. Li
26. *Craterium corniculatum* B. Zhang & Yu Li
27. *Craterium microcarpum* H.Z. Li, Yu Li & Shuang L. Chen
28. *Cribraria enodis* Z.H. Zhou & Yu Li
29. *Cribraria media* H.Z. Li & Yu Li
30. *Dianema macrosporum* B. Zhang & Yu Li
31. *Dianema microsporangium* H.Z. Li & Yu Li
32. *Dictyostelium annularibasimum* Yu Li, P. Liu & M.J. Zhao
33. *Dictyostelium barbarae* S.L. Stephenson, P. Liu, Y. Li & Y. Zou
34. *Dictyostelium globisporum* Yu Li & P. Liu
35. *Dictyostelium insulinativitatis* S.L. Stephenson, P. Liu, Y. Li & Y. Zou
36. *Dictyostelium microsorocarpum* Yu Li & Xiao L. He
37. *Dictyostelium minimum* Yu Li, P. Liu & Y. Zou
38. *Dictyostelium multiforme* Yu Li, P. Liu & Y. Zou
39. *Dictyostelium purpureum* var. pseudosessile Y. Li, P. Liu, Y. Zou, S.L. Stephenson & J.G. Hou
40. *Diderma verrucocapillitia* H. N. Zhao, B. Zhang & Y. Li
41. *Diderma liaoningensis* H. N. Zhao, B. Zhang & Y. Li
42. *Didymium pseudocolumellum* H.Z. Li, Yu Li & Q. Wang
43. *Entoloma liaoningense* Y. Li, L.L. Qi & Xiao L. He
44. *Gomphidius albipes* Yu Li & L.L. Qi
45. *Gymnopus changbaiensis* J.J. Hu, B. Zhang & Yu Li
46. *Gymnopus efibulatus* J.P. Li, Chang Tian Li, Chun Y. Deng & Yu Li
47. *Gymnopus globulosus* J.J. Hu, Y.L. Tuo, B. Zhang and Y. Li
48. *Gymnopus iodes* J.P. Li, Chang Tian Li, Chun Y. Deng & Yu Li
49. *Gymnopus longisterigmaticus* J.J. Hu, B. Zhang & Y. Li
50. *Gymnopus longus* J.J. Hu, B. Zhang & Yu Li
51. *Gymnopus macrosporus* J.J. Hu, B. Zhang & Yu Li
52. *Gymnopus omphalinoides* J.P. Li, T.H. Li & Yu Li
53. *Gymnopus schizophyllus* J.P. Li, T.H. Li & Yu Li
54. *Gymnopus sinopolyphyllus* J.P. Li, Chang Tian Li & Yu Li
55. *Gymnopus striatus* J.J. Hu, B. Zhang & Yu Li
56. *Gymnopus strigosipes* J.P. Li, Chang Tian Li, Yi Li & Yu Li
57. *Gymnopus tiliicola* J.J. Hu, B. Zhang and Y. Li
58. *Gymnopus tomentosus* J.J. Hu, B. Zhang and Y. Li
59. *Hemitrichia furcispiralis* Q. Wang, Yu Li & H.Z. Li
60. *Hemitrichia heterospora* Q. Wang & Yu Li
61. *Lepiota squamulose* T. Bau & Yu Li
62. *Licea reticulospora* H.Z. Li & Yu Li
63. *Melanoleuca galerina* YL and JX
64. *Melanoleuca subgrammopodia* YL and JX
65. Neonothopanus cystidiosus J.J. Hu, B. Zhang & Y. Li
66. *Oligonema oedonema* Yu Li, Shuang L. Chen & H.Z. Li
67. *Perichaena membranacea* Yu Li, Q. Wang & H.Z. Li
68. *Perichaena poronema* Yu Li & H.Z. Li
69. *Peronospora amethysteae* Yu Li & J.K. Bai
70. *Phaeoramularia cimicifugae* F.Y. Zhai, Y.L. Guo & Yu Li
71. *Phaeoramularia delphinii* F.Y. Zhai, Y.L. Guo & Yu Li
72. *Phaeoramularia papaveris* F.Y. Zhai, Y.L. Guo & Yu Li
73. *Physarum annulipes* Shuang L. Chen & Yu Li
74. *Physarum aurantiacum* Shuang L. Chen, Yu Li & H.Z. Li
75. *Physarum badhamioides* Shuang L. Chen & Yu Li

76. *Physarum caesium* Shuang L. Chen & Yu Li
77. *Physarum confusum* S. L. Chen et Yu Li
78. *Physarum deformans* Shuang L. Chen & Yu Li
79. *Physarum herbaticum* Shuang L. Chen & Yu Li
80. *Physarum loratum* Shuang L. Chen, Yu Li & H.Z. Li
81. *Physarum xylophilum* Shuang L. Chen & Yu Li
82. *Plenodomus changchunensis* R. Xu, Phukhams. & Yu Li
83. *Stemonaria liaoningensis* B. Zhang & Yu Li
84. *Stemonitis planusis* B. Zhang & Yu Li
85. *Stemonitis sichuanensis* B. Zhang & Yu Li
86. *Suillus foetidus* Y. Li & L.L. Qi
87. *Tandonella wangii* F.Y. Zhai, Y.L. Guo & Yu Li
88. *Trichia macrospora* B. Zhang & Yu Li
89. *Trichia ramose* Yu Li & H.Z. Li
90. *Tricholosporum haitangshanum* Yu Li & J.Z. Xu
91. *Tuber neoexcavatum* L. Fan & Yu Li
92. *Tuber sinoexcavatum* L. Fan & Yu Li
93. *Xanthagaricus ianthinus* Y. Li & F.J. Wang
94. *Xylaria atroglobosa* Hai X. Ma, Lar.N. Vassiljeva & Yu Li
95. *Xylaria bannaensis* Hai X. Ma, Lar.N. Vassiljeva & Yu Li
96. *Xylaria choui* Hai X. Ma, Lar.N. Vassiljeva & Yu Li
97. *Xylaria fanjingensis* Hai X. Ma, Lar.N. Vassiljeva & Yu Li
98. *Xylaria ficicola* Hai X. Ma, Lar.N. Vassiljeva & Yu Li
99. *Xylaria fusispora* Hai X. Ma, Lar.N. Vassiljeva & Yu Li
100. *Xylaria hemisphaerica* Hai X. Ma, Lar.N. Vassiljeva & Yu Li