

# A PRELIMINARY STUDY ON BRYOPHYTES FROM THREE BLACK LEAF MONKEY'S NATURE RESERVES IN GUIZHOU AND GUANGXI PROVINCE, S. W. CHINA \*

Zhang Zhaohui Wang Zhihui

(Department of Biological Science and Biotechnology, Guizhou Normal University, Guiyang 550001)

Ran Jingchen

(Management Department of Maolan Nature Reserve, Lipo county Guizhou 558400)

Lin Hong

(Forest Department of Guizhou Province, Guiyang 550001)

**Abstract** 91 bryophytes taxa on limestone are listed from three Black Leaf Monkey's nature reserves in Guizhou and Guangxi provinces, S. W. China, with habitat data of these 21 appear to be unrecorded for Guizhou province, and 13 for Guangxi province, 6 new records for S. W. China and 1 new record for China.

**Key words** Bryophytes; limestone; S. W. China

## INTRODUCTION

During last decade, three natural reserves have been set up for conservation of Black Leaf Monkey (*Presbytis f. francoisi*) in Guizhou province and Guangxi province, S. W. China. The climate of these reserves is basically subtropical, and most of the land consisting of limestone substrates. Bryologically, the bryoflora on limestone in these reserves is little known in China. \*

In 1994 ~ 1997, three bryological expeditions were organized to three Black Leaf Monkey nature reserves. About 500 numbers of bryophytes were collected by these expeditions. After our preliminary identification, a significant number of interesting taxa has already been discovered. In the following list, an asterisk indicates a new record for Guizhou province (\*), two asterisks for Guangxi province (\*\*), three asterisks for S. W. China (\*\*\*) and four asterisks being new to China (\*\*\*\*). All specimens are deposited in the herbarium of Department of Biological Science and Biotechnology, Guizhou Normal University.

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第一作者简介: 张朝晖, 男, 1963 年出生, 硕士, 副教授, 现贵州师大从事植物教学及研究工作。

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## STUDY SITES

Yezhong——the Yezhong Francois' Leaf Monkey Natural Reserve,  $104^{\circ}50' \sim 104^{\circ}56'E$ ,  $26^{\circ}11' \sim 26^{\circ}15'N$ , is situated in Liupanshui city, Guizhou province. It covers an area of  $13.62 \text{ km}^2$ , altitude  $780 \sim 2286 \text{ m}$ , taking on a karst valley geographical landscape. The annual mean temperature is  $13^{\circ}\text{C}$ , and annual amount of rainfall reaches  $1239.5 \text{ mm}$ . The primeval forest disappeared and vegetation was replaced by cultivated land, thickets and grass slopes.

Mayang——the Mayang River Black Leaf Monkey Nature Reserve,  $108^{\circ}7' \sim 108^{\circ}19'E$ ,  $28^{\circ}38' \sim 28^{\circ}4'N$ , is situated in Yanhe county, Guizhou province. It covers an area of  $26.5 \text{ km}^2$ , altitude  $280 \sim 1150 \text{ m}$ , main part of the region is carbonate rocks, taking on a karst valley geographical landscape. The annual mean temperature is  $16.7^{\circ}\text{C}$ , the annual rainfall is  $1158.7 \text{ mm}$ . Most of the area is covered by coniferbroad leaves mixed forest, shrub and grass

Fushue——the Fushue Rare Animal Nature Reserve,  $107^{\circ}48' \sim 107^{\circ}53'E$ ,  $22^{\circ}25' \sim 22^{\circ}28'N$ , is situated in Fushue county, Guangxi province. It covers an area of over  $20 \text{ km}^2$ , altitude  $190 \sim 350 \text{ m}$ , most of the area is limestone rock, taking on a karst Fengchong geographical landscape. Because of serious destruction, the primeval forest disappeared, and was replaced by naked rock, only a little deciduous broad-leaves mixed forest, shrub and grassland occurred.

## ANNOTATED LIST OF BRYOPHYTES

## LIVEWORTS

\* *Plagiochila trabeculata* Steph. Mayang, on limestone soil. alt.  $320 \text{ m}$ , No. 9029.

\* *P. ovalifolia* Mitt. Yezhong, on limestone under a shrubbery, alt.  $1190 \text{ m}$ , No. 8220.

\*\* *P. gracilis* Lindenb. & Gott. Fushue, on limestone under an evergreen and deciduous broadleaved mixed forest, alt.  $240 \text{ m}$ , No. 9060.

*Jungermania atrovireus* Dum. Yezhong, on tufa under a small waterfall, alt.  $860 \text{ m}$ , No. 8275.

\*\* *Mastigolejeunea auriculata* (Wils.) Schiffn. Fushue, on limestone under a shrubbery, alt.  $250 \text{ m}$ , No. 9050.

*Trocholejeunea sandvicensis* (Gott.) Mizut. Yezhong, on wet limestone, alt.  $1100 \text{ m}$ , No. 8238.

*Cheilolejeunea imbricata* (Nec.) Hatt. Yezhong, on limestone under *Phragmites communis*, No. 9003., alt.  $1260 \text{ m}$ , No. 8197.

\* *Lopholkeimea sibfisca* (Nee.) Steph. Yezhong, on limestone under a forest, alt.  $1100 \text{ m}$ , No. 8236.

\* *Lejeunea parva* (Hatt.) Mizut. Yezhong, on limestone under *Phragmites communis*, alt.  $1200 \text{ m}$ , No. 8195.

\*\* *Spruceanthus semirepandus* (Nee.) Verd. Fushue, on limestone under an evergreen and deciduous broad-leaved mixed forest, alt.  $240 \text{ m}$ , No. 9059.

\* *Plongiochasma intermediun* Lindenb. et Gott. Mayang, on tufa, alt.  $305 \text{ m}$ , No. 9017.

*P. rupestre* (Forst.) Steph. Yezhong, on tufa under cliff, alt.  $880 \text{ m}$ , No. 8259.

*Rebulia hemisphaerica* (L.) Redd. Yezhong, on limestone soil, at 0.3 m of cave mouth, alt. 1 365 m. No. 8191.

\* *Conocephalum japonicum* (Thumb.) Grolb. Mayang, on calcareous soil, alt. 300 m, No. 9004.

*C. conicum* (Lindb.) Steph. Mayang, on wet tufa in valley, alt. 300 m, No. 9021.

\* *Wiesnerella fasciaria* Gao et K. C. Chang. Yezhong, on thin limestone soil, alt. 1 220 m, No. 8205.

\* *W. denudata* (Mitt.) Steph. Mayang, on calcareous soil, alt. 302 m, No. 9005.

*Cyathodium rmaragdium* Schiffn ex Keireler. Mayang, on limestone, at depth 6 m of cave mouth, alt. 320 m, No. 9025

*Marchantia polymorpha* L. Mayang, on limestone soil, alt. 300 m, No 9006.

\* *M. convoluta* Gao et Chang. Mayang, on wet tufa, alt. 305 m, No. 9018.

\*\* *Porella javanica* (Gott. ex Steph.) Inoue. Fushue, on limestone under a shrubbery, alt. 295 m, No. 9053.

## MOSSES

*Fissidens gymnogynus* Besch. Mayang, on limestone soil, alt. 300 m, No. 9014.

*F. bryoides* Hedw. Mayang, on limestone in a depth 5 m of cave mouth, alt. 320 m, No. 9024.

\*\*\* *F. guangdongensis*. Iwats & Z. H. L. Mayang, on limestone in a cave depth 5 m, alt. 320 m, No. 9024.

*F. zippeliannus* Dozy & Molk Mayang, on limestone in a cave depth 12 m, alt. 320 m, No. 9024.

\*\*\* *F. zippeliannus* Dozy & Molk var. *robinsonii* (Broth.) Iwats & Suznk. Yezhong, on limestone soil in a cave depth 0.3 m, alt. 1 365 m, No. 8190.

\* *F. laxis* Sull & Lesq. Yezhong, on thin limestone soil, alt. 970 m, No. 8251.

\*\*\* *F. subdiscolor* Dix. Yezhong, on thin limestone soil under a *Quercus* sp. tree, alt. 1 210 m, No. 8209.

*F. mangarevensis* Mont. Yezhong, on limestone soil, alt. 1 220 m, No. 8223.

*Wesisa controversa* Hedw. Yezhong, on limestone, alt. 1 600 m, No. 8235.

\* *Tortella humilis* (Hedw.) Jenn. Mayang, on limestone, alt. 300 m, No. 9003.

\* *T. tortuosa* (Hedw.) Limpr. Mayang, on tufa, alt. 305 m, No. 9015.

\*\* *Timmia anomala* (B. S. G.) Limpr. Fushue, on limestone under a shrubbery, alt. 290 m, No. 9049.

*Merceyopsis sikkinensis* (C. Muell.) Broth. et Dix. Yezhong, on limestone, alt. 1 600 m, No. 8234.

*Hyophila involuta* (Hook.) Jaeg. Yezhong, on limestone, alt. 970 m, No. 8254.

*Tortula schmidii* (C. Muell.) Broth. Yezhong, on limestone, alt. 1 370 m, No. 8225.

*Gymnostomum aurantiacum* (Mitt.) Jaeg. Yezhong, on tufa under a small waterfall, alt. 880 m, No. 8278.

*Trichostomum aristatum* (Broth.) Hilp. Mayang, on limestone under frutex, alt. 310 m, No. 9039.

*Pseudosymblepharis papillosula* (Card et Ther.) Broth. Mayang, on limestone by road, alt. 540 m, No. 9043.

*Anoetangium clarum* Mitt. Yezhong, on tufa under water, alt. 880 m, No. 8257.

\* *A. stracheyanum* Mitt. Yezhong, on tufa under trees, alt. 1 050 m, No. 8249.

\* *Bryoerythrophyllum inaequalifolium* (Tayl.) Zander. Yezhong, on thin limestone soil, alt. 1 240 m, No. 8200.

\*\* *Barbula subcomosa* Broth. Fushue, on calcareous soil under a shrubbery, alt. 280 m, No. 9045.

*B. chenia* Redf. & Tan. Mayang, on limestone or tufa, alt. 300 or 306 m, No. 9023, No. 9016.

*B. coreensis* (Card.) Saito. Yezhong, on limestone soil, alt. 1 600 m, No. 8229.

\* *B. dixoniana* (Chen.) Zhang. Z. H. Yezhong, on tufa under a small waterfall, alt. 860 m, No. 8273.

\* *B. pseudoehrenbergii* Fleisch. Mayang, on limestone soil, alt. 300 m, No. 9002.

\* *B. williamsii*. (P. —C. Chen) Iwats. & Tan. Yezhong, on tufa, alt. 860 m, No. 8274.

\* *B. arcuata* Griff. Yezhong, on tufa under a small waterfall, alt. 860 m, No. 8269.

\*\*\* *Didymodon rivicola* Zander. Yezhong, on thin limestone soil alt. 880 m, No. 8261.

\*\*\* *D. gigantea* (Funck) Jur. Yezhong, on tufa under a small waterfall, alt. 865 m, No. 8280.

\* *B. subrivicola* Chen. Yezhong, on tufa, alt. 1 340 m, No. 8193 (a).

\* *Bryum turneriana* (Schwaegr.) Mitt. Mayang, on limestone soil, alt. 305 m, No. 9004.

*B. argenteum* Hedw. Yezhong, on limestone soil, alt. 1 200 m, No. 8216 (a).

*B. angustirete* Kindb. Yezhong, on limestone soil, alt. 1 200 m, No. 8216 (b).

*B. turbinatum* (Hedw.) Turm. Yezhong, on limestone under *Ficus*. sp. forest, alt. 1 205 m, No. 8214.

*B. cernuum* (Hedw.) B. S. G. Yezhong, on limestone, alt. 1 600 m, No. 8231.

*B. arctium* (R. Br.) B. S. G. Yezhong, on limestone, alt. 1 205 m, No. 8212.

*B. pallescens* Schleich ex Schwaegr. Yezhong, on limestone soil under forest, alt. 1 190 m, No. 8194.

*B. recurvulum* Mitt. Yezhong, on limestone, alt. 1 340 m, No. 8196.

*Racopilum aristatum* Mitt. Mayang, on limestone, alt. 310 m, No. 9032.

\*\* *Plagiomnium cuspidatum* (Hedw.) T. Kop. Fushue, on limestone under forest, alt. 240 m, No. 9060 (a)

*Philonotis capilliformis* Chen. Mayang, on limestone, alt. 300 m, No. 9003.

*P. turneriana* (Schwaegr.) Mitt. Mayang, on limestone, alt. 300 m, No. 9005.

*Pterobryopsis crassiuscula* (Card.) Broth. Yezhong, on limestone under forest, alt. 1 100 m, No. 8236.

*Floribundaria floribunda* (Doz. et Molk.) Fleish. Yezhong, on limestone, under a *Phragmites communis*, alt. 1 090 m, No. 8236.

\*\* *Neckeropsis lepineaana* (Mont.) Fleisch. Fushue, on limestone under forest, alt. 250 m, No. 9057.

\* \* \* *Thamnobryum laevinerve* Broth. Fushue, on limestone under an evergreen and deciduous broad-leaved mixed forest, alt. 240 m, No. 9060 (b).

\* \* *Homaliadelphus targionianus* (Mitt.) Dix. et P. Vard. Fushue, on limestone under frutex. alt. 290 m, No. 9049.

*Leskella nervosa* (Brid.) Losek. Mayang, on limestone soil alt. 320 m, No. 9005.

\* *Pseudoleskeella tectorum* (Brid.) Kindb. ex Broth. Mayang, on limestone in a cave depth 5 m, alt. 320 m, No. 9024.

\* \* *Haplohymenium sieboldii* (Ces.) Kindb. Fushue, on limestone under a shrubbery, alt. 295 m, No. 9054.

\* \* *Anomodon viticulosus* (Hedw.) Hook et Tayl. Fushue, on limestone under a shrubbery, alt. 295 m, No. 9054.

*A. thraustus* C. Muell. Mayang, on limestone under a shrubbery, alt. 310 m, No. 9038.

*A. rugelii* (C. Muell.) Keissl. Mayang, on limestone under a shrubbery, alt. 310 m, No. 9039 (a).

*A. minor* (Hedw.) Fuernr. Yezhong, on limestone, alt. 1 090 m, No. 8245.

*Claopodium nervosum* (Harv.) Fleisch. Yezhong, on limestone soil under a shrubbery, alt. 880 m, No. 9051

*Thuidium philibertii* Limpr. Mayang, on limestone under a shrubbery, alt. 310 m, No. 9039 (b.)

*T. cymbifolium* (Doz. et Molk.) Doz. et Molk. Mayang, on limestone under a shrubbery, alt. 310 m, No. 9033.

\* \* *Haplocladum microphyllum* (Hedw.) Broth. Fushue, on limestone under frutex, alt. 295 m, No. 9048, No. 9050.

\* \* *Brachythecium piliferum* Card. Fushue, on limestone under frutex, alt. 250 m, No. 9056.

*B. wichurae* (Broth.) Par. Fushue, on limestone under a shrubbery, alt. 280 m, No. 9051.

*Palamocladium sciureum* (Mitt.) Broth. Mayang, on limestone under a shrubbery, alt. 310 m, No. 9040 (b.)

*Oxyrrhynchium savatieri* (Besch.) Broth. Yezhong, on limestone under a shrubbery, alt. 1 260 m, No. 8198.

*Rhamphidium crassicoatum* L. Yezhong, on limestone, alt. 970 m, No. 8255.

*Pterigynandrum filiforme* Hedw. Yezhong, on limestone soil, alt. 1 190 m, No. 8218.

*Entodon cladorrhizans* (Hedw.) C. Muell. Yezhong, on limestone soil, alt. 1 240 m, No. 8201.

*E. viridulus* Card. Yezhong, on limestone, alt. 1 220 m, No. 8204.

\* *Sematophyllum subhumile* (C. Mull.) Fleisch. Fushue, on limestone, alt. 200 m, No. 9046.

\* \* \* *Eurohypnum leptothallum* var. *tereticaule* (C. Mull.) Nog. Mayang, on limestone, alt. 480 m, 9040, 9044.

*Taxiphyllum taxirameum* (Mitt.) Fleisch. Mayang, on limestone soil in a cave. alt. 300 m, No. 9008.

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## 黔桂黑叶猴自然保护区苔藓植物初步研究

张朝晖 王智慧

(贵州师范大学生物科学技术系, 贵阳 550001)

冉景丞

林 虹

(贵州茂兰自然保护区, 荔波 558400) (贵州省林业厅, 贵阳 550001)

**摘 要** 本文报道中国西南黔桂两省区三个黑叶猴自然保护区内石灰岩苔藓植物 91 种, 并对其生境进行了描述。在上述石灰岩苔藓植物中, 包含 21 种贵州新记录, 13 种广西新记录, 6 种中国西南新记录和 1 种中国新记录。

**关键词** 苔藓植物; 石灰岩; 中国西南

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