

THE BRYOFLORA OF FENCYANCSHAN NATURE RESERVE IN ZHEJIANG PROVINCE, CHINA

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Abstract Fengyangshan Nature Reserve is situated in southwestern Zhejiang Province. 299 species (including subspecies and varieties) of bryophytes were confirmed. 24 new records in East China are reported. An analysis of geographical and floristic elements of the Nature Reserve is presented.

Key words Fengyangshan; Bryoflora

INTRODUCTION

Fengyangshan Nature Reserve, covering an area of about 47 km², is located near 27°55' N. and 119°11' E. in the southwestern part of Zhejiang Province, China. Its main peak, Huangmaojian, is 1921 m above sea level and is the highest peak of the province. It has a mid-subtropical monsoon climate with four distinct seasons. This area is characterized by lower temperature, more abundant precipitation and higher moisture compared with other areas in the province which have the same latitude. The earth is mainly mid-subtropical yellow brown earth with PH 5.0 ~ 5.0. The dominant types of vegetation are evergreen broad-leaved forests and needle-broad-leaved mixed forests.

Fengyangshan Nature Reserve was established in 1975 (now is a part of Fengyangshan-baishanzu Nature Reserve) in order to protect its ecosystem and biological diversity. Previously several field surveys on biological resources were conducted and 1 028 species of seed plants were reported (Investigation Group 1984, unpubl. data). There is almost no study on bryophyte except for a new species and some epiphyllous liverworts^[7]. In July, 1994, the author carried out an investigation of Fengyangshan bryoflora. A total of 1 042 specimens were identified, including 368 collected by the senior author and 674 by Zhu Ruiliang in August, 1992 and May, respectively. 299 species belonging to 140 genera and 63 families were reported. Among them, according to Redfearn^[4], Piippo^[3], Chang & Lai *et al.*^[8], 24 species are confirmed to be new to East China (includes Fujian, Zhejiang, Jiangsu, Anhui, Jiangxi and Shanghai).

In addition, 8 genera are the first records for East China. They are *Abietinella*, *Campylopodium*, *Gammiella*, *Geocalyx*, *Hymenostylium*, *Loeskeobryum* Mylia, *Timmia*. Timmiaceae was found for the first time in East China.

LIST OF NEWLY RECORDED TAXA

An alphabetical list of the new records for East China is presented below. For each species, collecting numbers are given. All specimens cited below are deposited in the botanical herbarium of East China Normal University. As for nomenclature, Hepaticae mostly follows Piippo^[3] and Musci follows Redfearn^[4].

Abietinella arbuscula Mitt. 94320

Andreaea rupestris Hedw. 92276 94037

Bazzania tricenata (Wahlenb.) Lindb. 92089

Bryum billarderi Schwaegr. 92442 93034 94201

Campylopodium medium (Duby) Giese & Frahm 94030

Ctenidium pinnatum (Broth. & Par.) Broth. 94311 94253

Dicranum assamicum Dix. 92089 92439 92548 94058 92473 94296

Fissidens obscurus Mitt. 92317

Gammiella pterogonioides (Harv.) Par. 92186 92674 94180

Geocalyx lancistipulus (Steph.) Hatt. 92655

Herbertus huerlimannii H. A. Miller 92307 94147

Hymenostylium recurvirostre (Hedw.) Dix. 94076

Lepidozia wallichiana Gott. 92055 92265 92332 92455 922 925564 92624 92589

Loeskeobryum cavifolium (Lac.) Fleisch. ex Broth. 93004 94106 92642 94283 92612 92634 92577 94097
92562 92405 92298 94034 92064 94190

Macromitrium reinwardtii Schwaegr. 94330

Melendaea sendtneriana var. *Yunnanenica* Gyorffy. 93019 94187

Mylia verrucosa Lindb. 94270 92562 94079

Pterobryon arbuscula Mitt. 92189

Taxithelium nepalense (Schwaegr.) Broth. 94072

Thuidium philibertii Limpr. 92009 92290 94353 92551 92467 92097 92303

T. pygmaeum B. S. G. 92241 92452 94189 94220 94276

T. subglaucinum Card. 92558 92485

Timmia megapolitana Hedw. 94060

Trichostomum tenuirostre (Hokk. & Tay.) Lindb. 94191

BRYOFLORESTIC DISCUSSION

An analysis of the bryogeographical components of 299 species of Fengyangshan bryoflora was attempted. The bryophytes can be classified into six groups as shown in Table. 1.

1. Cosmopolitan Elements

These include species distributed almost all over the world. There are 19 species in Fengyangshan such as *Metzgeria furcata*, *Marchantia polymorpha*, *Sphagnum palustre*, *Bryum argenterum*, *Hypnum cupressiforme*, *Polytrichum commune*.

2. Northern Hemispher Elements

71 species belong to this group, e. g. *Apometzgeria pubescens*, *Conocephalum conicum*, *Brachythecium populeum*, *Andreaea rupestris*, *philonotis fontana*.

Table 1. Bryogeographical analysis of Fengyangshan bryoflora

Bryogeographical elements	Number of species (including varieties & subspecies)	Percentage (%)
Cosmopolitan	19	6.4
Northern Hemisphere	71	23.7
Pantropic	69	23.1
E Asia & N. America	9	3.0
East Asia	121	40.5
Chinese endemic	10	3.3
Total	299	100

3. Pantropical Elements

69 species can be placed in this group. Examples includue *Frullania moniliata*, *Leucobryum javense*, *Trachypus bicolor*, *Aerobryum speciosum*, *Homaliodendron scalpellifolium*, *Pylaisiadelph erythrocaulis*.

4. East Asiatic and North American Disjunctive Elements

9 species are of this group such as *Cololejeunea macounii*, *Brothera leana*, *Entodon compressus*.

5. East Asiatic Elements

This group is consisted of 121 species and is the most abundant one of the local bryoflora. Examples include *Geocalyx lancistipulus*, *Eopleurozia gigantoides*, *Porella perrottetiana*, *Climacium japonicum*, *Racopilum aristatum*, *Pylaisiella brotheri*.

6. Chinese Endemic Elements

8 species and 2 varieties are Chinese endemics. e. g. *Cololejeunea latistylosa*, *Cololejeunea latilobula* var. *wuyiensis*, *Melendoea sedtnerina* var. *yunnanenica*, *Schlotheimia pungens*, *Entodon taiwanensis*. Among them, *Cololejeunea latistylousais* a new species reported by Zhu Ruiliang in 1994 and only found in Fengyangshan and Baishanzu, China so far.

According to Table 1, East Asiatic Elements representing 40.5% of the total number constitute the major portion of Fengyangshan bryoflora. And 63 species in this group are found only in China, Japan and Korea. It indicates that Fengyangshan bryoflora is apparently East Asiatic and is close related to Japanese bryoflora.

The groups of Northern hemisphere elements and Pantropic elements are the second dominant groups. Fengyangshan has a “in between” geographical position which is similar to Jiulongshan^[2] and Wuyanling^[6], so their bryoflora are similar. All of them represent the transitional type from northern subtropics to southern subtropics.

Compared with other nature reserves in the same province^[1, 2 5 6] Fengyangshan bryoflora is characterized by more families (63) and relatively fewer species. It indicates that Fengyangshan bryoflora is rather rich in families, the poor species may be attributed to the strongly destroyed vegetation below 1 400 m above sea level in which only adaptable species can survive. The destroyed vegetation also results in an undefined vertical distribution in spite of *Andreaea rupestris* found near the summit of Huangmaojian.

In conclusion, the bryoflora of Fengyangshan is rich. It is transitional in vegetation zonal character because the percentage of Northern Hemisphere elements is almost equal to that of Pantropical elements, but mainly East Asiatic in floristic composition.

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浙江凤阳山自然保护区苔藓植物区系的研究

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摘 要 凤阳山自然保护区位于浙江省西南部。本文报道了对凤阳山苔藓植物区系调查研究的结果, 共发现苔藓植物 299 种, 其中 24 种为华东新记录。此外, 还对该保护区的苔藓植物进行了区系分析。

关键词 凤阳山; 苔藓植物区系

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