



## Original article

## Distribution characteristics of plants in the Ungseokbong Mountain, Gyeongsangnam-do, Korea



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## ARTICLE INFO

## Article history:

Received 24 January 2014

Received in revised form

11 March 2014

Accepted 27 March 2014

Available online 24 April 2014

## Keywords:

Rare plants

Endemic plants

Specific plants designated by the Ministry of

Environment

Naturalized plants

## ABSTRACT

This study was conducted 13 surveys from 2007 through 2012. The surveys on the entire plants distribution in the Ungseokbong Mountain found 491 taxa in total: 99 families, 290 genera, 419 species, 3 subspecies, 61 varieties, and 8 forms. 1,211 specimens were secured as evidence. In particular, 11 taxa of the rare plants which were designated by the Korea Forest Service were confirmed, and 12 taxa of the endemic plants were confirmed in this study. Those plants above Class III of the specific plants designated by the Ministry of Environment were confirmed 19 taxa. Among them, in particular, it was confirmed that *Kirengeshoma koreana* Nakai has a new habitat in the Unseokbong. Naturalized plants included 34 taxa accounting for 6.9% were representatively confirmed.

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## Introduction

The Ungseokbong Mountain is located on the administrative boundary with: Na-ri, Sancheong-eup; Honggye-ri, Samjang-myeon; and Cheonggye-ri, Danseong-myeon, Sancheong-gun, Gyeongsangnam-do, which is 1,099 m high. It is situated at 35 degrees 21 minutes north latitude and 127 degrees 52 minutes east longitude, and designated as a county park in 1983. A branch from Cheongwangbong (peak; 1,915 m) of Jirisan Mountain, it has rough and irregular sides, and is sometimes used for a rain calling ceremony in the year of drought. The name of 'Ungseok' derives from the shape of peak looking like a bear ('Ung' means a bear in Chinese character). The Jirisan Mountain (1,915 m) is located in the west of survey site; and Hwangmaesan Mountain (1,104 m) is located in its northeast side. The Ungseokbong Mountain stands tall in the southern part of the Sobaek Mountains suffering from continuous uplifts and erosions and phasing in forming intermount basins, highlands, and plains accompanied by deep valleys mainly with granite and granite gneiss (Kim and Kil, 2000). Floristically, the mountain belongs to the southern sub-district among 8 sub-districts in the Korean District (Lee and Yim, 2002). Sancheong-gun indicates its 6-year average temperature of

13.2 °C from 2007 through 2012 with the average highest temperature of 19.2 °C and the average lowest temperature of 8.1 °C, and with the annual average precipitation of 1,641.2 mm; among which average temperature and average highest temperature are indicated to gradually decrease (Table 1, Korea Meteorological Administration Seoul, 2007, 2008, 2009, 2010, 2011 and 2012).

There are previous studies by Kim (2010), An and Choo (2010) conducted on the Ungseokbong Mountain in terms of structural analysis on flora and forest community; though, which are limited to the reference of approximate plant distribution. In fact, there is no study on the whole plant distribution in the Unseokbong Mountain. In this regard, this study was conducted to provide basic materials to secure plant distribution information by obtaining evidence specimens and further efficiently manage and conserve rare and endemic plants through the surveys on plant distribution in the Unseokbong Mountain, Gyeongsangnam-do.

## Materials and methods

This area was prior surveyed from April through October 2007; in 2012 an additional complementary survey was conducted (Figure 1, Table 2). In addition, the accuracy of results required collecting only the individuals with generative organs such as flower, fruit, and spore, etc.; if not mature or without a generative organ, those that could be exactly identified were recorded (Appendix 1). Those collected plants were made in a dry specimen and maintained in the

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Peer review under responsibility of National Science Museum of Korea (NSMK) and Korea National Arboretum (KNA).

**Table 1**

The annual mean temperature and precipitation in the Unseokbong Mountain, Gyeongsangnam-do, Korea for the recent 6 years (2007–2012).

Division	Temperature (°C)			Precipitation (mm)
	Mean	Mean maximum	Mean minimum	
2007	13.8	19.9	8.8	1775.9
2008	13.2	19.7	7.9	785.5
2009	13.4	19.8	8.0	1169.0
2010	13.0	19.0	8.1	2189.5
2011	13.1	18.7	8.2	2013.1
2012	12.8	18.5	8.1	1914.2
Average	13.2	19.2	8.1	1,641.2

Korea National Herbarium (KH) of the Korea National Arboretum. Identifying the taxa was conducted using the illustrated plant book written by Lee (1980, 2003a, 2003b) and Lee (1996a, 1996b); major specific plants that deserve special mention were identified referring to the Ministry of Environment National Institute of Environmental Research (2006), endemic plants were identified referring to Oh et al. (2005a), rare plants were identified referring to the Korea National Arboretum (2008), and naturalized plants were identified referring to Park (1995, 2001, 2009), Lee et al. (2011). Classification system and scientific names were subject to the Korea National Arboretum, 2014 of the Korea National Arboretum.

## Result

### Flora survey

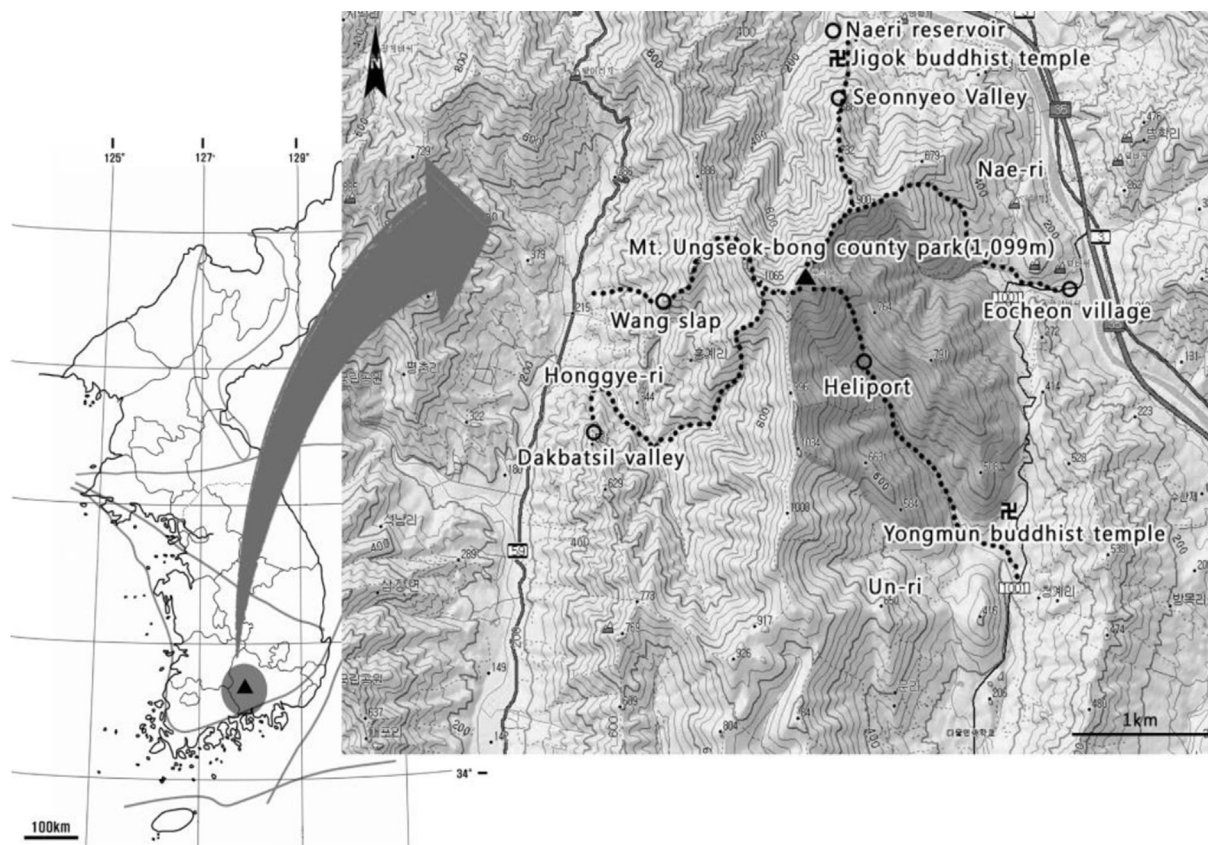
The results of surveying the flora in the Ungseokbong Mountain revealed a total of 99 families, 290 genera, 419 species, 3 subspecies,

61 varieties, 8 forms, and 491 taxa. Taxonomically, pteridophyta was surveyed as many as 7 families, 13 genera, and 27 taxa; gymnosperm was surveyed as many as 3 families, 3 genera, and 3 taxa; and dicotyledonous plant out of angiosperm was surveyed as many as 77 families, 212 genera, and 343 taxa and non-dicotyledonous plant out of angiosperm was surveyed as many as 12 families, 62 genera, and 118 taxa (Table 3). As for the diversity by family structuring species, chrysanthemum family recorded 54 taxa (10.9%), the highest, which was followed by gramineae (45 taxa, 9.1%), liliaceae (28 taxa, 5.7%), and cyperaceae (25 taxa, 5.0%).

Shrub layer was dominantly distributed largely by *Corylopsis gotoana* var. *coreana* (Uyeki) T.Yamaz. ranging from the peak of the Ungseokbong Mountain through the ridge to the helicopter landing site and ranging from the peak to the all direction to Naeri reservoir while *Rhododendron mucronulatum* Turcz. and *R. schlippenbachii* Maxim., etc. are significantly distributed at the foot of the mountain. According to the survey on some of the species conducted by Kim (2010), *Sorbus commixta* Hedl. and *Hosta longipes* (Franch. & Sav.) Matsum., etc. were distributed ranging from the peak of the Ungseokbong Mountain to the helicopter landing site; which had yet to be confirmed in this study, and judging from the fact that rather this study found *Sorbaria sorbifolia* var. *stellipila* Maxim. and *Hosta capitata* (Koidz.) Nakai, such Kim's data appears to be a wrong identification.

### Endemic plants

*Aconitum austro-koreense* Koidz., an endemic plant confirmed in the survey, is sporadically distributed along with trail paths around the valleys while *Thalictrum uchiyamai* Nakai is located in the direction of Naeri reservoir from the peak and around forest roads, posing a concern to be stamped or collected by climbers. Besides, a



**Figure 1.** Map of the investigated area in this study.

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