

## Evaluation of *Rhododendron* Ornamental Value through Fuzzy Similarity Priority Ratio and Grey System

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**Abstract**— Ornamental value of 20 *rhododendron* species were investigated. A total of 13 ornamental characteristics were evaluated using Fuzzy Similarity Priority Ratio and Grey system method in the “One Hundred Li *Rhododendron*” Forest Area in Guizhou, China. This result indicated that ten species with higher ornamental value should be widely cultivated in this Forest Area.

### I. INTRODUCTION

**R**HODODENDRON is a member of Ericaceae. There are 850 species of wild *rhododendron* all over the world [1]. It is one of the top ten famous traditional flowers in China. In landscape and gardens, *rhododendron* is an important ornamental plant, which has gorgeous flowers and diversified habit.

In the “One Hundred Li *Rhododendron*” Forest Area of Guizhou, China, the great nature scenery attracts many Chinese and foreign tourists when *rhododendron* open fully in mountains in early spring. In this area, about 20 species had been documented and each of them has its unique ornamental value, such as shrub to tree habit, various flower colors and shapes [2],[3]. To select better ornamental features and improve the aesthetic value in this scenic area, it is important to re-evaluate ornamental importance of each species. However, there is no standard and feasible method to evaluate *rhododendron*, especially to evaluate *rhododendron* comprehensively. This study aims to select some species of *Rhododendron* with high ornamental value through fuzzy similarity priority ratio and grey system based on investigating the original data of the ornamental characters of *rhododendron* in field, providing basis for rational development and scientific plans of this forest area, and for breed selection of *rhododendron*.

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### II. EXPERIMENT MATERIALS

For this study, a total of 20 species were selected from “One Hundred Li *Rhododendron*” Forest Area in Guizhou, China. (Table I)

TABLE I  
TWENTY SPECIES OF FAZALEA

No.	Species Name	No.	Species Name
B <sub>1</sub>	<i>R. delavayi</i> Franch	B <sub>11</sub>	<i>R. fuchsifolium</i> Levl
B <sub>2</sub>	<i>R. imratum</i> Franch	B <sub>12</sub>	<i>R. anthospharum</i> Dab
B <sub>3</sub>	<i>R. imratum</i> <i>Franch. subsp. pogonostylum</i> <i>Chamb. ex Cullen et Chamb</i>	B <sub>13</sub>	<i>R. blylorum</i> Levl
B <sub>4</sub>	<i>R. agastum</i> Balfjet WWSmith	B <sub>14</sub>	<i>R. pulchrum</i> Sweet
B <sub>5</sub>	<i>R. agastum</i> Balfjet WWSmith <i>var. pennivenium</i> Ming	B <sub>15</sub>	<i>R. sidcrophylum</i> Franch
B <sub>6</sub>	<i>R. arboreum</i> Smith	B <sub>16</sub>	<i>R. simsii</i> Planch
B <sub>7</sub>	<i>R. calothyrum</i> Franch	B <sub>17</sub>	<i>R. simsii</i> Planch <i>Var. sp.</i>
B <sub>8</sub>	<i>R. cavaleriei</i> Levl	B <sub>18</sub>	<i>R. wilsonii</i> Hemsl. et alib
B <sub>9</sub>	<i>R. decorum</i> Franch	B <sub>19</sub>	<i>R. sinouatallii</i> Balfjet <i>Forrest</i>
B <sub>20</sub>	<i>R. retrovirens</i> Franch	B <sub>20</sub>	<i>R. fortunei</i> Lindl

### III. EXPERIMENT METHODS

#### A. Survey of Ornamental Features

Thirteen characteristics, which had high influence on ornamental value of *rhododendron*, were measured for one year. These descriptors were used as the major evaluation criteria.  $X_j(j=1,2,\dots,13)$  were expressed as flower color, kinds of color, corolla, anthesis, size of corolla, anthotaxy, flower numbers of one anthotaxy, pedicel, fragrance, spots on corolla, texture and brightness of leaf, size of leaf, tree shape. Ten vigor adult plants of each species were measured and investigated. Then, mean of each criteria were used for evaluation.

#### B. Evaluation Method

All data processing and comparison were done with Excel, DPS, and SAS8.0 through fuzzy similarity priority ratio and

