

## What alpine plants attract visitors in the Daisetsuzan national park, northern, Japan?

\*Yukihiro Amagai<sup>1</sup>, Kota Mameno<sup>1,2</sup>, Hiroyuki Oguma<sup>1</sup>, Takahiro Kubo<sup>1</sup>

1. National Institute for Environmental Studies, 2. Hokkaido University

The Daisetsuzan National Park in Hokkaido northern Japan is visited by 5 million people every year, because the Taisetsu Mountains have large fields of alpine vegetation. In the alpine zone, many alpine plant species (365 species: including subspecies and variants as well as 27 Japanese endemic species) grow. However, alpine vegetation has remarkably changed, with alpine dwarf-pine (*Pinus pumila*) and dwarf-bamboo (*Sasa kurilensis*) distributions having expanded during the last decade along with significant changes in the vegetation structure. From such a background, selection of protected areas, evaluation of vulnerability for each plant species and community type, and adaptation management, there are urgent problems for the conservation of biodiversity in the alpine zone. Furthermore, change of alpine vegetation can be considered to damage as tourism resources as well. Therefore, purpose of this study is to clarify the preference of visitor to alpine plant species for collecting baseline information of tourism resources as one conservation indicator.

This study was conducted at the Sugatami Station of the Daisetsuzan Asahidake Ropeway which is located at an elevation of 1600 m, and the treeline is located at an elevation of around 1400-1700m. Therefore, visitors can easily hike and watch for alpine plants in alpine area. To clarify visitors preference for alpine plant species, we distributed questionnaires to visitors at the place. Respondents were asked “what flower do you want to see (check the all plants at posted picture of 20 species)”, and socio-demographics including experiences of visiting Daisetsuzan national parks. The number of questionnaires distributed were 1201 in 6 days of August 2018, and a total of 451 respondents participated our survey. The plant pictures which were showed respondents in the questionnaire were selected from 18 typical alpine plants, which considering habitats, plant growth form, and flower color (*Trollius riederianus*, *Stellaria pterosperma*, *Primula cuneifolia*, *Anemone narcissiflora* var. *sachalinensis*, *Therorhodon camtschaticum*, *Lagotis yesoensis*, *Pentstemon frutescens*, *Nephrophyllidium crista-galli*, *Pedicularis oederi*, *Phyllodoce aleutica*, *Dicentra peregrina*, *Saxifraga laciniata*, *Trichophorum cespitosum*, *Drosera anglica*, *Gentiana jamesii*, *Sieversia pentapetala*, *Campanula chamissonis*, *Eriophorum*) and *P. pumila* and *S. kurilensis*.

As a result, *S. pentapetala*, *G. jamesii*, and *P. cuneifolia* are high preference, while *T. cespitosum*, *S. kurilensis*, and *P. pumila* are low. From the respondent information, repeaters had high preference to *S. pentapetala* and *D. peregrina* than first time visitor. Furthermore, we analyzed flower (15 species) and whole (20 species) morphological feature by generalized linear model (GLM) for clarify the preferred features. As a result, the high preference to flower features are: the inflorescence was flat, the number was few, and the color tended to be pink > purple > white  $\geq$  yellow plants. And the whole features are: leaves had gloss, leaf size was small, plant height was low.

Therefore, the *S. pentapetala* is the most attractive species for many visitors, which species is necessary for secure repeaters also. The *S. pentapetala* is not a specific species in the Taisetsu Mountains, because it distributes wide area in the alpine, eastern Japan. However, in the Taisetsu Mountains, a large community is formed along the trail, resulting it represents the image of the flower garden. Therefore, as tourism resources, it is important to maintain a large flower garden and suppress the influence of the expansion of *P. pumila* and *S. kurilensis*, which low preference species. Furthermore, the popular plants

have feature that low height and few flowers from ranking based on the preference by GLM, resulting the visitors expect to see the dwarf plants just like image of alpine plants. On the other hand, we also revealed that species considered to be important as tourism resources are not necessarily consistent with rare and preferential conservation. Therefore, it is necessary to consider the balance between tourism resources and biodiversity.

Keywords: Alpine, People-plant interactions, Preference, Plant morphology, Climate change, Conservation