XV WORLD FORESTRY CONGRESS
Building a Green, Healthy and Resilient Future with Forests
2–6 May 2022 | Coex, Seoul, Republic of Korea

Building Floral Fauna data and Vegetation Map with Drone-based investigation

Minsuk Oh[1], Jinyeong Choi[3], Seunghwan Lee[1,2]

[1] Laboratory of Insect Biosystematics, Department of Agricultural Biotechnology, Seoul National University, Seoul, South Korea, ary364@snu.ac.kr
[2]Research Institute of Agriculture and Life Sciences, Seoul National University, Seoul, South Korea, seung@snu.ac.kr
[3]Okinawa Kagaku Gijustu Daigakuin Daigaku, Onna, Okinawa, Japan, Jinyeong.Choi@oist.jp

Introduction

In apiculture, floral fauna of their surroundings highly related to quality of honey and pollen. Particularly, this factor is critical in stationary beekeeping rather than mobile beekeeping system, which moves according to the blooming season. Therefore, in order to investigate and select an ideal site for stationary beekeeping, it is important to understand the source and composition of floral fauna of certain area. In this study, we selected beekeeping farms in two different regions, and investigated floral source and environmental composition of each location. In addition, to construct more robust faunatic study, we used camera-attached drone to conduct a survey for hard-to-reach areas.

Material & Method

Table 1. research period and results of Mokdong-ri, Gapyeong-gun, Gyeonggi-do

Investigation	Date		Results
1	2020	May 8th	Identifying geographic features, confirming the distribution of honey plants in spring: *Prunus jamasakura* Siebold, and *Rhododendron schlippenbachii* Maxim.
2		May 28th	Confirming honey plant distribution: *Robinia pseudoacacia* L., *Castanea crenata* Siebold & Zucc., *Rosa multiflora* Thunb., *Actinidia arguta* (Siebold & Zucc.) Planch. ex Miq., and *Ziziphus jujuba* Mill.
3		July 9th	Confirming honey plant distribution: *Castanea crenata* Siebold and Zucc., *Tilia amurensis* Rupr.
4		Sep. 15th	Confirming honey plant distribution: *Fagopyrum esculentum* Moench, *Perilla frutescens* (L.) Britton, *Impatiens textori* Miq., *Humulus japonicus* Siebold & Zucc., *Aster scaber* Thunb.
5		Oct. 23rd	Confirming honey plant distribution: *Dendranthema boreale* (Makino) Ling, *Aster yomena* (Kitam.) Honda, *Agastache rugosa* (Fisch. & C. A. Mey.) Kuntze

Table 2. research period and results of Hangye-ri, Inje-gun, Gangwon-do

Investigation	Date		Results
1	2019	April 15th	Identifying distribution of conifer colony
2		May 3rd	Confirming honey plant distribution: *Prunus sp.* and *Quercus sp.*
3		May 10th	Confirming honey plant distribution: *Quercus sp.* etc.
4		May 28th	Confirming honey plant distribution of *Robinia pseudoacacia* L.
5		June 24th	Confirming honey plant distribution: *Castanea crenata* Siebold and Zucc., *Tilia amurensis* Rupr.
6	2020	April 30th	Confirming honey plant distribution: *Prunus jamasakura* Siebold, and Pyrus ussuriensis Maxim.
7		May 29th	Confirming honey plant distribution: *Robinia pseudoacacia* L., and *Rosa multiflora* Thunb.
8		July 8th	Confirming honey plant distribution: *Castanea crenata* Siebold and Zucc., *Tilia amurensis* Rupr.
9		August 20th	Confirming honey plant distribution: *Rhus javanica* L., *Kalopanax septemlobus* (Thunb.) Koidz., and *Aralia elata* (Miq.) Seem.

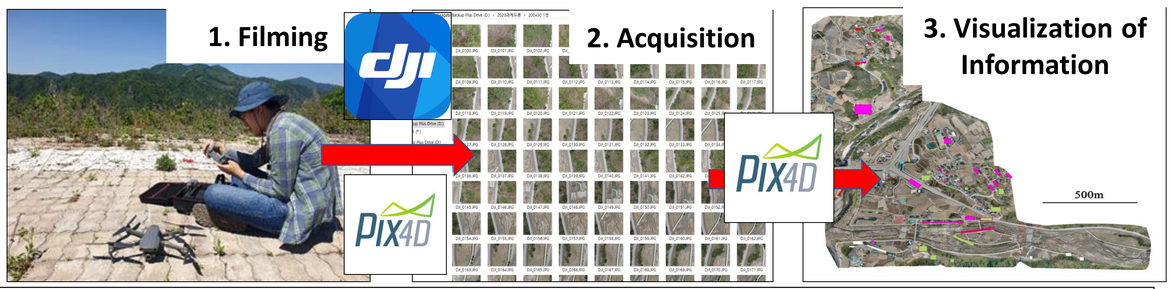

Figure 1. Research process for construct vegetation map

1. Study sites
- The study was conducted from 2019 to 2020 in two different beekeeping regions: Mokdong-ri, Gapyeong-gun, Gyeonggi-do, and Hangye-ri, Inje-gun, Gangwon-do. In each region, the drone investigation was performed on a central radius of 2km by region. Detailed information of study period and honey plants are as in Table 1 and 2.

2. Field research
- The field research is carried out via drone with DJI GO, and Pix4D programs for close-up filming and forest slope survey.

3. Honey plants investigation and digital mapping
- The pictures from drone investigation were merged into ortho imagery using Pix4D, and information input of honey plants into ortho imagery was performed according to the color information of pictures and field investigation.

Result & Discussion

1. Honey plant fauna and environmental features of Mokdong-ri, Buk-myeon, GG.
- Major honey plants such as *Hovenia dulcis* (Oriental resin tree), *Kalopanax septemlobus* (castor aralia), *Castanea crenata* (Chestnut) and *Rhododendron schlippenbachii* (Royal azalea) were planted at near central point.
- Chestnuts, Jujubes, wild roses, gooseberries and Raspberries were widely distributed at survey site.
- Among the plants known as the main honey plants such as False acasia, linden tree and bush clover were comparatively rare.
- Among herbaceous plants, great celandine, Lyre-shape hemistepta, and daisy fleabane were mainly discovered. Also, grasslands and lumbered grounds were widely distributed on the slopes of the mountain.

2. Honey plant fauna and environmental features of Hangyae-ri, Buk-myeon, GW.
- Major honey plants such as false acasia, linden tree, bush clovers, cherry trees, castor aralia and royal azalea were planted at near central point.
- Sand pear, false acacia, cherry trees, royal azalea were widely distributed at survey site.
- Among the plants known as the main honey plants, Chestnut trees were comparatively rare.
- On the mountain slope, widely covered with Coniferus plants including pine trees, and oak trees which can work as good pollen provider. Total extent of grasslands and lumbered grounds were comparatively small.

3. Discussion
- In our investigation, there was a difference in major honey plant composition. In addition, auxiliary honey plants also showing significant difference. This result implies different beekeeping environments could be developed in similar climates and conditions.
- In both target site, artificial planting of diverse honey plants was observed. This creation of a honey plant environment could help improve and diversify the quality of honeybee products.
- If this honey plant investigation and visualization method can be applied to other beekeeping area, it is thought that the evaluation of beekeeping suitability for specific area can be facilitated.
- In addition, it is expected to be helpful in establishing local products development, in the point of characterization of honeybee products with reflection of regional features.

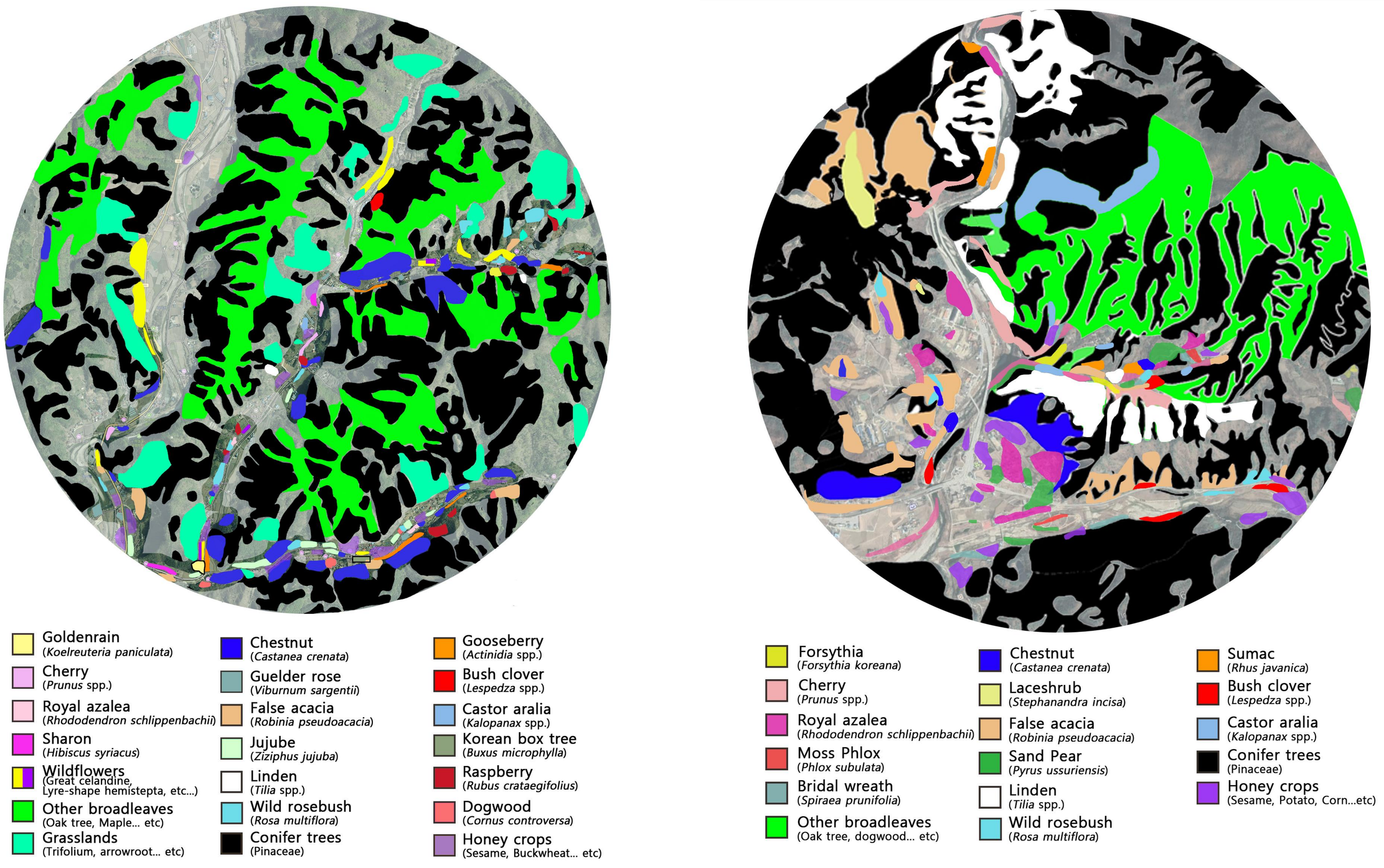

Figure 2. Vegitation map for honey plant of targeted area (Left: Mokdong-ri, GG/Right: Hangyae-ri, GW)

Acknowledgement: This study was carried out with the support of ´R&D Program for Forest Science Technology (Project No. 2021362B10-2123-BD01)´ provided by Korea Forest Service(Korea Forestry Promotion Institute).