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Research Paper

Phenology of *Veronica beccabungal* flowering in NW Iran

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Abstract: Identification of plants distribution honey plants in an area are very important and necessary for the Apiculture and Nectar production plays an important role in the pollination of flowering plants. The aim of this research was determine flowering duration and delay for *Veronica beccabungal* family Shanjan Rangeland. This research was conducted in Shanjan Rangeland with elevation between 1600 m to 2050 m with SW aspect in Shabestar district, East Azerbaijan, Iran in spring and summer 2011. For sampling, we used an accidental sampling methodology (1*1 m quadrate) in this research and selected 10 samples in each 8 stations separately. Difference elevation was 55 m between each station. There is about 10.75 days delay for each 110 m elevation for start flowering for this plant.

Keywords: *Veronica beccabungal*, Phenology, flowering

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Introduction

Identification of plants distribution honey plants in an area are very important and necessary for the Apiculture and Nectar production plays an important role in the pollination of flowering plants (Southwick and Southwick, 1983).

Because of diversity of plants and number of flowers in an area has an important effects on utilization by honey bees, Therefore, the identification of these plants for nectar or pollen feeding is very important in a region. Because of benefits of bees and trees or plants depend on phenology and biogeography. Most of these factors are specific to location, and depend heavily on seasonal weather patterns (HILL et al., 1995). In addition, beekeepers can inform for potential pasture for foraging nectar and pollen production, and foraging management for theirs bees in the region, this will be important when the nectar and pollen production have been reduce in an area. If a beekeeper has good information about this crisis dates during foraging period in a pasture, he can manage his beehives movement on time before he spend so much cost for artificial nectar and sugar.

A colony of honey bees requires average 30 kg of pollen and 40 kg nectar per year (Diemer, 1988;Nair et al., 1974). Razaghikamroudi et. al. studied on Nour River Watershed (north Iran) and found the famous pollen producer plants in this area is from Leguminosae, Rosaceae, Compositae, and Labiatae (Razaghikamroudi, 2000;Razaghikamroudi et al., 2006). Manafi found in honey from Northwest Iran (Azerbayjan area) the most pollen in Khoy, Oskou and kalibar districts are from Asteraceae (specially from Helianthus or Sunflower), Labiatae and Leguminosae plants, respectively (Manafi and 180-183., 1994). Memarian found the most pollens in honey produced in Khorasan Province are from Compositae plants (Memarian, 2000), he studied 43 Tribes from 28 plant families. Nazarian et al. found the most pollens in honey produced in Tehran Province are from Compositae, Leguminosae, Labiatae, Rosaceae, Brassicaceae, Umbelliferae, Liliaceae, Papaveraceae, Boraginaceae and Malvaceae (Nazarian et al., 1997). Barbara suggested the best way for identifying and classification of plants is pollen identifying (Barbara, 1991). Crompton and Wojtas studied on pollen grains of Canadian honey plants and published a book with this name (Crompton, 1993). In adition period of flowering affect on amont of nectar and pollen producing, Collison (1973) sampled Cucumis sativa blossoms and found that nectar was only secreted on the first day of anthesis with none on the days thereafter (Collison, 1973;Southwick and Southwick, 1983).

Much work has been done on nectar production and pollinator interaction, especially in tropical, southern and southwestern American species, and north European species (Southwick and Southwick, 1983).Unfortunately, like this research have not studied yet.

As potential producing of pollen and nectar vary for different condition as climate, soil and topography in foraging duration of honey bees in rangelands, it is so important for knowing different phonological changes of plant for planning hives relocation time.

Materials and Methods

This research was conducted in Shanjan Rangeland with elevation between 1600 m to 2050 m with SW aspect in Shabestar district, East Azerbaijan, Iran (Figure 1) in spring and summer 2011. This region is component of Iran-Turan Flora with elevation between 1700-1850 m (Bibalani et al., 2011b). The terrain in this area is hilly (Bibalani et al., 2011a;Bibalani et al., 2011b)and we carried out the study on a site with a SW aspect (Figure 2).

Table 1: Scientific name for *Veronica beccabungal* Classification Report (USDA, 2011).

Kingdom	*Plantae* – Plants
Subkingdom	*Tracheobionta* – Vascular plants
Superdivision	*Spermatophyta* – Seed plants
Division	*Magnoliophyta* – Flowering plants
Class	*Magnoliopsida* – Dicotyledons
Subclass	*Asteridae*
Order	*Scrophulariales*
Family	*Scrophulariaceae* – Figwort family
Genus	*Veronica* L. – speedwell
Species	*Veronica beccabungal* L. – European speedwell

For sampling, we used an accidental sampling methodology (1*1 m quadrate) in this research and selected 10 samples in each 8 stations separately (Figure 3). Difference elevation was 55 m between each station.

Scrophulariaceae, the figwort family, is a family of flowering plants. The plants are annual or perennial herbs with flowers with bilateral (zygomorphic) or rarely radial (actinomorphic) symmetry. Members of the Scrophulariaceae have a cosmopolitan distribution (Olmstead et al., 2001;Wikipedia, 2011a).

In the past it was treated as including about 275 genera and over 5,000 species, but its circumscription has been radically altered since numerous molecular phylogenies have shown the traditional broad circumscription to be grossly polyphyletic. Many genera have recently been transferred to other families within the Lamiales, notably Plantaginaceae and Orobanchaceae but also several new families (Olmstead, 2003;Olmstead et al., 2001).

Veronica beccabunga or *Veronica beccabungal* (Brooklime, European speedwell) is a succulent herb belonging to the family Scrophulariaceae. It grows on the margins of brooks and ditches in Europe, North Africa and north and western Asia. It can be found on other continents as an introduced species. It has smooth spreading branches, blunt oblong leaves and small bright blue or pink flowers (Wikipedia, 2011b).

We studied a species of Scrophulariaceae family such as *Veronica beccabungal* (Figure 4, Table 1).

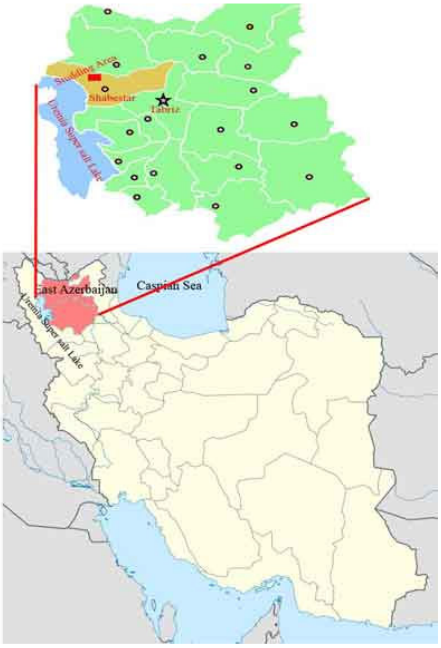

Figure 1: Location of Studding area on map of Iran.

Figure 2: Studding area at Shanjan rangeland in Shabestar district, East Azerbaijan province, Iran.

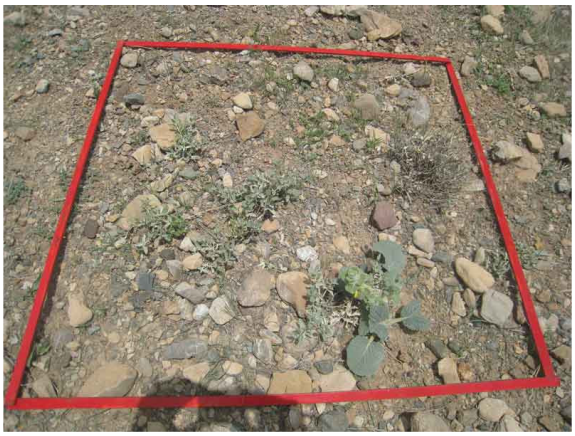

Figure 3: Sampling design in 1*1 m quadrate plot.

Figure 4. *Veronica beccabungal.*

RESULTS

We studied 8 stations with 55 m deference between each of them. The lowest elevation for first station was 1600 m and the last was 2040 m. Flowering date was very close relation with deferent elevation for this plants. Flowering date was on April, 22, 2011 in first station with elevation equal 1600 m and it was on May 20, 2011 on last station with 2040 m elevation for this plant. It showed about 29 days delay for flowering of *Veronica beccabungal* with 440 m elevation deference. The other hand, there are about 10.75 days delay for each 110 m elevation deference for flowering start of this plant (Figure 5).

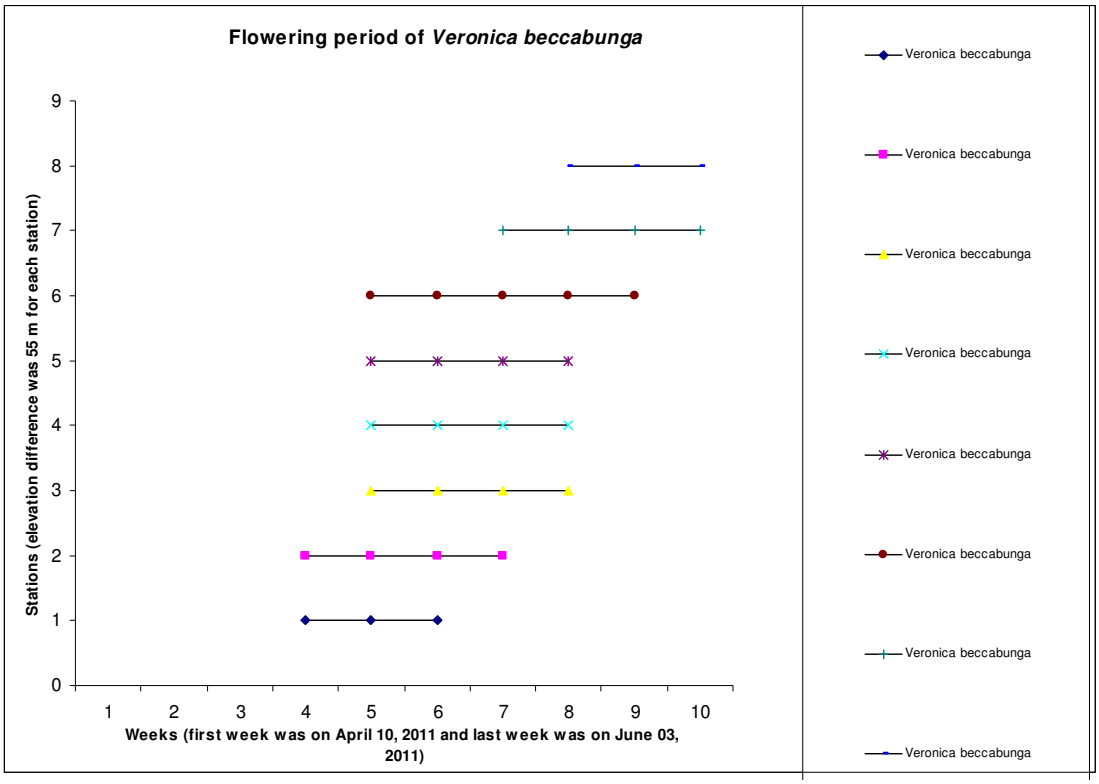

Figure 5: Flowering period (start and end of flowering) of Veronica beccabunga in research area

Conclusions

We studied flowering period as an important factor for pollination, nectar and pollen usage with honey bees. Much of the previous work on flower nectar has not taken into account the age of the blossoms as a factor in nectar production; yet several studies indicate that age is important (Southwick and Southwick, 1983). Ewert (1936) reported that aged flowers in several lime species yielded twice the weight of nectar of young flowers (both protected from insect pollination) (Ewert, 1936;Southwick and Southwick, 1983). But Besides age of flowers, it is so important to know period of flowering duration for each plant in an area. As results of this research (Figure 5), Veronica beccabunga had flowering period about 43 days.

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