



The study of Pollen and Nectar Bearing Plants in Ardebil

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Abstract

In order to determine the habitat need of number of pollen and nectar bearing plants in the province of Ardabil, library studies were done such as the study of resources available, including followers and articles, the results of research in the field of native aromatic herbs aromatic, as well as consultation with teachers and scholars and distribution of them in the province and its habitats, and then field operations were began to determine the species in their natural habitats with locating and any necessary notes in terms of slope, elevation, soil. To study the geographical distribution of the species, geographic location of studied species was recorded by using no plot sampling method and through ground surveys by GPS. Thus, the coordinates of latitude and altitude of each of them were recorded, and the spatial distribution map of each species was prepared at standard level of GIS environment, the results showed that, in MeshginShahr and Khalkhal, with respectively 32% and 28% respectively had the highest number, which in past years, they were rich plants in terms of germplasm, but unfortunately now because of climate change, overgrazing and illegal harvesting of some jobber, this germplasm are greatly reduced, and threatened with extinction and destruction. During the study, a total of 98 species were identified, the results showed that 27.3% of the collected species belonged to the Compositae¹ family, and the families of Rosaceae, Labiatae, liliaceae, were ranked next. The number and percent of species was studied and the results showed that areas with altitudes of 1000 to 1500 and 1500 to 2000 with 48 and 19 percent had the highest number respectively.

Keywords: *spatial distribution, nectar bearing plants, pollen bearing plants, Ardabil.*

Introduction

Ardabil is located in the north-western Iran, and it makes up one percent of the province, due to the special geographical position has been one of the most important centers of beekeeping, honey produced by beekeepers, as Sabalan honey is of great notoriety in Iran and the world. Beekeepers are dependent on plant, water, air and the soil to supply their food, water, air and soil lead to grow a variety of plants, and also beekeepers continue their lives by collecting nectar and pollen of flowers. There are over 250 thousand species of flowering plants in nature, many of which produce nectar and pollen, and beekeepers when collecting them, pollinate many flowers of the plants. 40 thousand different species of plants have been identified as food sources somewhat important for beekeepers, and another four thousand species of plants are considered as the main sources of honey produced

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in the world. The numbers of Leguminosae plants in Ardabil province are planted, and since they can't be harvested before flowering, so in terms of beekeeping and honey production are more important. Among Cruciferae plants, many of the products belong to the Brassica which have abundant nectar resources, and some species are planted for seed production, which we can note to cooking oil including Brassica napus² and are planted in Moghan plain. Cotton is planted in the Pars Abad and Bilesuar in the Ardabil province and is considered as a reliable honey source, and 100 to 300 kg of honey bees can produce per hectare, but now, the cotton fields are spraying with chemical pesticides against pests, they do not produce honey, and in the future, by changing the chemical control methods and using the biological methods and, etc., beekeepers will be able to produce more honey by transferring the hives to fields, trees produce many flowers in the forest, and with a number of fruit trees are considered as important sources of honey.



According to the human lifestyle changes over time, and one-dimensional manipulation in natural habitats, it is necessary that pasture are also used and managed in other aspects. Unethical use and excessive exploitation of pastures in Ghareh Aghach region has been imposed heavy stress on the body of the Plains, and in most regions we can observe the effects of the destruction of vegetation. So it is necessary that, in addition to identifying regional capacity through the study of natural ecosystems, vegetation used by bees also be studied. Therefore, in order to exploit the potential of natural resources in order to use the correct terms such as beekeepers, we need to develop comprehensive and accurate information in the field of recognizing the potential of the plants in the breeding and keeping of bees. The study of plants producing nectar and pollen is very important in the field of recognition of a region in terms of the beekeeping user, in this regard, various studies have been carried out, including Ghalechnia (1998) which was conducted on the countryside Mazandaran province and introduced the most Nectar species including Fabaceae, Lamiaceae, Rosaceae³. Asadi et al. (1997) in the central province identified 139 plant species from 32 plant families, Elmie et al. (1997) identified 180 plant species in five regions of East Azerbaijan Province. Nazari et al. (1998) in Tehran have introduced the most important plant families used by bees including the family of citrus, Leguminosae, Lamiaceae, Rosaceae and Cruciferae. Also, they identified 186 genera and 301 species used by bees used of 54 plant families. Razeghi Kamrodi (2004) evaluated variety of plants in summer pastures of East of Mazandaran in terms of beekeeping, and the families of Lamiaceae, chicory, Leguminosae, Rosaceae, Cruciferae, Borage and Malva were introduced as most important plant species for beekeeping. Sabbaghi et al. (2007) in the Tar o Bar watershed determine the attractiveness of the plant species and introduced the families of citrus, Lamiaceae, Rosaceae, Leguminosae, Cruciferae, Apiaceae, speedwell, cloves and Acantholimon as the most important plant families of beekeeping in region. Faghih et al. (2005) in Isfahan, Karimi & Jafari (2007) in the Fars province, and Akbar zadh & Razaghikamrodi (1997) in Mazandaran, respectively, introduced Papilionoideae, chicory, mint and Apiaceae (because of flowers with

abundant pollen and the specific characteristics and substances in the nectar and pollen of flowers). Coffey & Green (1997) in Ireland, have identified 76 Pollen and Nectar bearing species. Amoako (1997) in Ghana, introduced 255 Pollen and Nectar bearing species. Freitas (1994) by analysis of pollen samples in the Caatinga in Brazil, identified 62 species. Shahid (1992) in Kathmandu, has studied the attractiveness of 178 plant species from 45 plant families, and in the Northwest Frontier Province of Pakistan, has reported the most important plant families, respectively, citrus, Rosaceae, Leguminosae and Lamiaceae. Massey (1992) in Kathmandu, has introduced Rosaceae, Myrtus, Ruta and Cruciferae as the most important plant families. Verma (2008) in Nepal, has identified 31 species which are a favorite of bees. The aim of this study was to evaluate the diversity of Nectar and pollen bearing plants in beekeeping management of rangelands in the province based on previous research to use rangelands capacity of rangelands, as well as research centers and universities. According to the above, the aim of this study was to determine the habitat need of numbers of pollen and nectar bearing plants in Ardabil province.

¹**Asteraceae or Compositae** (commonly referred to as the **aster, daisy, composite, or sunflower family**) is an exceedingly large and widespread family of flowering plants (Angiospermae). The family has more than 23,600 currently accepted species, spread across 1,620 genera (list) and 13 subfamilies. In terms of numbers of species, the Asteraceae are rivaled only by the Orchidaceae. (Which of the two families is actually larger is unclear, owing to uncertainty about exactly how many species exist in each family.) Many members have composite flowers in the form of flower heads (capitula or pseudanthia) surrounded by involucre bracts. When viewed from a distance, each capitulum may have the appearance of being a single flower. The name "Asteraceae" comes from *Aster*, the most prominent genus in the family, that derives from the Greek ἀστὴρ, meaning star, and is connected with its inflorescence star form. "Compositae" is an older but still valid name which refers to the fact that the family is one of the few angiosperm ones to have composite flowers.



²**Rapeseed** (*Brassica napus*), also known as **rape**, **oilseed rape**, **rapa**, **rappi**, **rapaseed**, (and, in the case of one particular group of cultivars, **canola**), is a bright-yellow flowering member of the family Brassicaceae (mustard or cabbage family), (Mandarin Pinyin *yóucài*; Cantonese: *yauchoy*) consumed in China and Southern Africa as a vegetable. The name derives from the Latin for turnip, *rāpa* or *rāpum*, and is first recorded in English at the end of the 14th century. Older writers usually distinguished the turnip and rape by the adjectives 'round' and 'long' ('-rooted'), respectively.^[2] Rutabagas, *Brassica napobrassica*, are sometimes considered a variety of *B. napus*. Some botanists also include the closely related *B. campestris* within *B. napus*.

³**Rosaceae** (the **rose family**) is a medium-sized family of flowering plants, including about 2830 species in 95 genera. The name is derived from the type genus *Rosa*. Among the most species-rich genera are *Alchemilla* (270), *Sorbus* (260), *Crataegus* (260), *Cotoneaster* (260), *Rubus* (250), and *Prunus* (plums, cherries, peaches, apricots, and almonds) with about 200 species. However, all of these numbers should be seen as estimates - much taxonomic work remains.

Materials and methods

During the study, each year, according to the phenology stages of the desired species, and the time needed to reach seeds to the species distribution areas, and after careful examination of the site, and after making sure the mother plants are healthy, the seeds were collected, if the desired species was dominant, and formed a type, collection was not faced with many problems, but long periods of time were spent to collect seeds from species that had less distribution. To collect the seeds of these species, areas were carefully examined, and collection was done in the areas where the species formed Micro-type. After collecting the seeds and packaging them in paper bags, gene bank information form was completed, and information requested on this form was examined carefully. This information includes the date of collection, the area code, sample code, family name, name of the genus, and species and varieties, information about the material collected, spatial, geological and geomorphological

characteristics of the sampling location and other information. The position of the sampling and ground form for each sample was carefully examined, and was proceeding towards completion. To calculate the length, width and height above sea level, at the beginning of the project, maps of 1:50,000, and then GPS was used, and to determine the slope percentage, the inclinometer was used.

Results and discussion

The frequency and distribution of some plant species for different regions of the province was determined after the implementation of the study. In total, from different areas of study, we can note to areas such as: Meshgin Shahr and Khalkhal, respectively with 32 and 28 percent respectively had the highest number (Table 1). In past years, they were rich plants in terms of germplasm, but unfortunately now because of climate change, overgrazing and illegal harvesting of some jobber, this germplasm are greatly reduced, and threatened with extinction and destruction. During the study, a total of 98 species were identified, the results showed that 27.3% of the collected species belonged to the Compositae family, and the families of Rosaceae, Labiatae, Liliaceae, were ranked next. The number and percent of species was studied and the results showed that areas with altitudes of 1000 to 1500 and 1500 to 2000 with 48 and 19 percent had the highest number respectively. The study of plants producing nectar and pollen is very important in the field of recognition of a region in terms of the beekeeping user, in this regard, various studies have been carried out, including Ghalechnia (1998) which was conducted on the countryside Mazandaran province and introduced the most Nectar species including Fabaceae, Lamiaceae, Rosaceae. Asadi et al. (1997) in the central province identified 139 plant species from 32 plant families, Elmie et al. (1997) identified 180 plant species in five regions of East Azerbaijan Province. Nazari et al. (1998) in Tehran have introduced the most important plant families used by bees including the family of citrus, Leguminosae, Lamiaceae, Rosaceae and Cruciferae. Also, they identified 186 genera and 301 species used by bees used of 54 plant families. Razeghi Kamrodi (2004) evaluated variety of plants in summer pastures of East of Mazandaran in terms



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Regions	No	%
Khalkhal (Khalkhal - Hashjin - Asalem)	67	28
MeshginShahr(Sabalan - Ahar)	75	32
Moghan (Germi - Bilehsavar - Parsabad)	24	10
Ardabil (Plain of Ardabil)	34	14
Namin (Namin - Fandoghlu - Heiran)	38	16

Table 1. Number and percentage of speciescollected, disaggregated by region

Gender	No	%
<i>Compositae</i>	33	27.27
<i>Plumbaginaceae</i>	2	1.65
<i>Malvaceae</i>	4	3.30
<i>Cruciferae</i>	1	0.82
<i>Ranunculaceae</i>	6	4.95
<i>Rosaceae</i>	11	9.09
<i>Rubiaceae</i>	1	0.82
<i>Labiatae</i>	3	2.48
<i>Papilionaceae</i>	5	4.13
<i>Boroginaceae</i>	3	2.48
<i>Liliaceae</i>	9	7.43
<i>An.orientalisRosaceae</i>	1	0.82
<i>Geraminae</i>	5	4.13
<i>Polygonaceae</i>	1	0.82
<i>Iridaceae</i>	2	1.65
<i>Oleaceae</i>	1	0.82
<i>Caprifoliaceae</i>	1	0.82
<i>Labiatae</i>	8	6.61
<i>Sdanaceae</i>	1	0.82
<i>Dipsacaceae</i>	1	0.82
<i>Crassulaceae</i>	1	0.82
<i>Caryophyllaceae</i>	1	0.82
<i>Cruciferae</i>	3	2.48
<i>Umbellifeerae</i>	2	1.65
<i>Corylaeae</i>	1	0.82
<i>Berberidaceae</i>	2	1.65
<i>Geranaceae</i>	1	0.82
<i>Raginaceae BO</i>	1	0.82
<i>Scorophulariaceae</i>	1	0.82
<i>Papaveraceae</i>	1	0.82
<i>Hypericaceae</i>	2	1.65
<i>Solanaceae</i>	1	0.82
<i>Chenopodiaceae</i>	4	3.30
<i>Capparidaceae</i>	1	0.82



Table 2. The number of species collected on the number and percentage of each

Height	Numbers	Percent
0-500	3	3
500-1000	6	6
1000-1500	45	48
1500-2000	19	20
<2000	20	22

Table 3. Number and percentage of species collected disaggregated by Heights.

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