

VASCULAR PLANTS OF HAWRAMAN REGION IN KURDISTAN IRAQ

A Dissertation

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﴿بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ﴾

فَلْيَنْظُرِ الْإِنْسَانُ إِلَى طَعَامِهِ (24) أَنَا صَبَبْنَا الْمَاءَ
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لَكُمْ وَلِأَنْعَمِكُمْ (32)

سورة عبس

صدق الله العظيم

In the Name of Allah, the Most Gracious, the Most Merciful

Then let mankind look at his food (24) How We poured down water in torrents (25) Then We broke open the earth, splitting [it with sprouts] (26) And caused to grow within it grain(27) And grapes and herbage (28) And olive and palm trees (29) And gardens of dense shrubbery (30) And fruit and grass (31) [As] enjoyment for you and your grazing livestock (32).

Allah has spoken the truth

Supervisor Certification

I certify that this dissertation was prepared under my supervision in the University of Sulaimani, Faculty of Agricultural Sciences, as partial fulfillment of the requirements for the degree of Ph.D. of Science in **Plant Taxonomy**

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Linguistic Evaluation Certification

I hereby certify that this dissertation prepared by (**Saman A. Ahmad**), has been read and checked and after indicating all the grammatical and spelling mistakes; the dissertation was given again to the candidate to make the adequate corrections. After the second reading, I found that the candidate corrected the indicated mistakes. Therefore, I certify that this dissertation is free from mistakes.

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Summary

Hawraman area is one of the most important plant areas in Kurdistan Iraq, as well as in the Irano-Turanian region. It is located about 50 km east of Sulaimani City between latitudes 35°05'–35°20'N and longitudes 45°53'–46°11'E. Its altitudes range from as low as 484 m near Darbandikhan Lake to 2,598 m, the highest peak known as Hanae Nawa north of Sargat Village. It is about 33 km long and about 30 km at its widest part and occupies in Kurdistan Iraq a total area about 660 km².

The present Study is based on a three-year (2011–2013) intensive field studies of the plants of Hawraman coupled, with extensive survey of the literature and examination of specimens in various herbaria inside and outside Iraq. All specimens collected during this study were identified, numbered, classified and deposited in the herbarium of the Faculty of Agricultural sciences, Sulaimani University (SUFA). During this study about 3,500 specimens were collected at 135 waypoints on 33 trips each of which lasted two to three days. In order to avoid repetition and confusion during data collection, each species is given a unique number of a continuous series. For each collection number, coordinates (longitude and latitude), altitude, date, exact locality, and ecological information were recorded. After collecting at each waypoint, photographic plant profiles were made for most species in that area.

The alphabetic arrangement of all taxa was used from the family to the varietal ranks. Family limits and generic placements follow Mabberley (2008) and the Angiosperm Phylogeny Website (see P. 18). Abbreviations of author names follow the IPNI(International Plant name Index) website.

This study covers a total of 1084 taxa, of which 951 were collected during the three-year fieldwork. This investigation covered all vascular plants of Hawraman, including those collected by earlier botanists. Information about duration, frequency in the field, and reproductive status were recorded. The study also covered additional information, such as local names, ethnobotanical uses (e.g., food, medicine, tools, fibers, ornaments, flavors, drinks, and condiments).

This study adds 15 families and 426 taxa as new to the Hawraman area checklist and four species new to science: *Ferula shehbaziana* (Apiaceae), *Onosma hawramanensis* (Boraginaceae), *Gypsophila sarbagiae* (Caryophyllaceae), and *Scrophularia sulaimanica* (Scrophulariaceae). The study also adds the following 19 species as new to the flora of Iraq: Apiaceae (*Heracleum persicum*), (*Trigonosciadium brachytaenium*), Araceae (*Arum dioscoridis*), Asteraceae (*Filago eriocephala*), Boraginaceae (*Alkanna orientalis*), (*Nonea ventricosa*), Caryophyllaceae (*Gypsophila caricifolia*), (*Silene coniflora*), Cyperaceae (*Schoenoplectus lacustris*) Gentianaceae (*Centaurium meyeri*), Lamiaceae (*Marrubium parviflorum*), (*Nepeta nuda*), Liliaceae (*Fritillaria strausii*), (*Tulipa clusiana*), Poaceae (*Bromus intermedius*), Plantaginaceae (*Linaria simplex*), Polygonaceae (*Polygonum convolvulus*), (*Polygonum hydropiper*) and Rosaceae (*Prunus lycioides*).

This study has also identified 33 Hawraman area species as Kurdistan endemics, of which three (*Silene avramana*, *Astragalus tawilicus*, and *Dionysia bornmuelleri*) are restricted to Hawraman of Iraq and Iran and determined as critically endangered according to IUCN Red List.

There are four different vegetation zones in Hawraman: moist steppe zone (about 264 km² or 44% of the total Hawraman area), forest zone (about 322 km², or 48% of the total Hawraman area), timberline zone (about 18 km², or 3% of the total area of Hawraman), and thorn-cushion or subalpine zone (about 24 km², or about 4% of the Hawraman total).

The vascular plants of Hawraman area are made up primarily of herbaceous species (92%), and trees and shrubs represent only 8% of total.

The shared number of plant species between Hawraman and Iran is 748 (70%), Hawraman and Turkey is 630 (58%), and Hawraman and Syria is 318 (30%).

Finally, this study has collected ethnobotanical information on 29 families and 64 species.

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1. CHAPTER ONE

Introduction, literature review, and collectors

1.1 Introduction

Hawraman area is one of the most important plant areas in Kurdistan Iraq, and the Irano-Turainian region. It mountain runs along the Persian frontier 15–25 km northeast and north of Halabja District (Guest and Rawi, 1966) and occupies an area of about 3600 km² in Kurdistan of both Iraq and Iran, with the biggest part in Iran and only about 660 km² in Iraq.

Hawraman area in Kurdistan Iraq (hereafter Hawraman) is surrounded by diverse topographic areas: Shaho Mountain on its east, Sharazoor land on the west, serpentine foothills with Swren Mountain on the north, and Zawalle mountain from the south.

Hawraman is one of five major mountains in Kurdistan Iraq that are rather poorly explored botanically (the others are Halgurd, Sakri Sakran, Qandil, and Assos). The vast majority of Hawraman collections were made from Tawella or Biyara, both of which were accessible by road to earlier botanists. However, the remote areas and higher elevations of the mountain from above 2000 m have never been surveyed. All prior collections made by foreigners were done in the spring and early summer and from tiny portions of this vast mountain range. Indeed, late summer and autumn flora of the mountain were totally unknown prior to this research.

The principal goal of this study is to thoroughly survey the vascular flora of Hawraman, one the five most diversified mountains in Kurdistan Iraq, which has not been studied adequately by any botanist and for which all collections by foreign botanists are deposited in Europe. Although there are some duplicates in the Baghdad herbaria, none is found in any Kurdistan herbarium. Most parts of the mountain have never been explored before because of its rugged terrain and because those unexplored areas are located at the strategic border with Iran. In addition to the floristic study, all efforts

were made to record for the first time the ethnobotany of the people living in the mountain because if these aspects are not recorded now, it is feared that they will disappear in the near future as more and more people move to other jobs and ignore the past.

1.2 Literature review and collectors

Detailed botanical explorations of Hawraman, whether conducted by local or foreign investigators, simply do not exist, and there is no literature covering previous plant explorations of the mountain. Indeed, there are relatively small number of plant collections from Hawraman in the foreign or Iraqi herbaria.

Relatively few botanists explored Hawraman. The first and most notable of these was Heinrich Carl Haussknecht (1830–1903), a German botanist who, along with his son, collected plants in northern Iraq (Jabal Sindjar, Jezireh, Kurdistan, etc.) and Kurdistan Iran during the years 1865–1867. A large series of new plants were discovered by this botanist in the mountain and subalpine zone of Kurdistan Iraq (Zohary, 1946), and his collections are housed primarily in Friedrich-Schiller-Universität Jena (JE). He and/or Swiss botanist Pierre Edmond Boissier (1810–1885), author of the monumental *Flora Orientalis*, described those novelties from Hawraman Iraq-Iran. In all, 96 specimens of 96 species were collected by Haussknecht from Hawraman. About 36 specimens of 36 species were collected in 1960 by the Czech botanist Emil Hadač and deposited in the National Museum in Prague (PR), with some duplicates in Baghdad University College of Science herbarium (BUH). The British botanist J. B. Gillett resided in Iraq in 1946–1948, during which time he collected in Biyara some 73 specimens currently deposited in Kew (K), with some duplicates in the National Herbarium of Iraq (BAG).

Perhaps some of the important Hawraman collections were made by the Austrian botanist Karl Heinz Rechinger (1906–1998), editor and author of most of the landmark *Flora Iranica*. He collected some 303 specimens of 280 species, and the complete set of his specimens is deposited at the

Naturhistorische Museum Wien (W), with some duplicates at BUH. Another major set of collection was done by Ali Rawi and his assistants at BAG. They collected from Hawraman 343 specimens of 295 species, and their duplicates were sent to Royal Botanical Garden Kew (K) for determinations. Finally, a few collections were made mainly from Darbandikhan and areas close to Halabja by the American botanists Fred A. Barkley in the mid 1960s, and his main set of specimens is housed in the College of Agriculture of Baghdad University (BUA), with duplicates exchanged with many herbaria worldwide.

The most recent floristic works useful for Kurdistan Iraq are six of the nine-volume flora of Iraq published between 1966 and 1985. Drafts of volume five/part two and volume six, which describe most of the missing families, will soon be published. These publications were very helpful in knowing what has already been recorded from Hawraman, as well as in the identification of unknown plants. In addition, and perhaps more important, is the near-completed 179-volume work of Flora Iranica (Rechinger, 1963–2012). Although in Latin, every volume of this monumental work was checked to see what has been recorded for Hawraman.

2. CHAPTER TWO

Location and Topography

2.1 Location

Hawraman area is located in the Kurdistan Iraq Region of Sulaimani Governorate. It is part of the extensive Zagros Mountain Steppe ecoregion (World Wildlife, 2007, see link on p.268) or the Kurdo-Zagrosian ecoregion (Zohary, 1973). Hawraman area is situated about 50 km east of Sulaimani City between latitudes 35°05'–35°20'N and longitudes 45°53'–46°11'E. Its altitudes range from as low as 484 m near Darbandikhan Lake to 2,598 m, the highest peak known as Hanae Nawa north of Sargat Village. It is about 33 km long and about 30 km at its widest part and occupies in Kurdistan Iraq a total area about 660 km².

2.2 Topography

Guest (in Guest and Rawi, 1966) divided Iraq into four topographic regions; Mountain Region, Upper Plains and Foothills Region, Desert Plateau Region, and Lower Mesopotamian Region. Hawraman is part of the Mountain Region in Sulaimani District (abbreviated here after as MSU).

The Hawraman topography is divided into the following zones:

2.2.1 Mountain Zone

This zone represents a large part of the region and consists of two main series of mountains:

2.2.1.1 Hawraman Mountain subzone

This is located along the IraqIran border starting from north of Tawella village on the southern portion of the Hawraman area Subzone northwestward into Dallani, Rangin, and Hana Nawa peaks with elevation range of 1,100–2,598 m (Fig. 2-1).



Figure 2-1: Hawara Barza Mountain facing east (2013)

2.2.1.2 Shnirwe-Bafre Mere Mountain subzone

The eastern side of this subzone is located between the Iraq/Iran border westward near Ababaili Village in Halabja district. The elevation in this subzone ranges between 1,100 and as high as 2,010 m at its Bafre Mere Peak (Figs. 2-2, 1 and 2). No plant samples were collected from this area prior to this study.



Figure 2-2: 1. Bafre Mere Mountain, facing southeast (2012); 2. Shnirwe Mountain, facing south (2012)

2.2.2 Valley Zone

There are many valleys in the Hawraman region, especially in the mountainous areas. This zone is divided as the following:

2.2.2.1 Wshkanaw Valley

This is located in the Hawraman Mountain Subzone and stretches northeast-southwest. It begins from the highest point at 1,194 m (35°19'20"N, 46°06'09"E) above the Zallm waterfall and ends at 630 m in Zallm Valley near Ahmad Awa village (Fig. 2-3).



Figure 2-3: Wshkanaw Valley, facing north (2013)

2.2.2.2 Darimarr Valley

Is also located in the Hawraman Mountain Subzone starting from the northeast near the Iraq-Iran border at 1,458 m (35°18'13"N, 46°07'44"E) to the southeast near Sargat Village.

2.2.2.3 Biyara Valley

This is a large valley in which located on the Iraqi side both Zardahal and Khargellan villages. It starts above Kemna Village on the Iranian side at 1,736 m (35°16'13"N, 46°09'27"E) toward Sharazoor land through Biyara town.

2.2.2.4 Bakhakon Valley:

It starts above Dekone Village, near the Iranian border from Shram Mountain side at 1,365 m (35°15'47"N, 46°07'21"E) and towers to 880 m near Gulp Village.

2.2.2.5 Tawella Valley

Starting above Tawella Village at 1,684 m (35°13'00"N, 46°11'20"E) and towers to 1,100 m near Hawar Village (Fig. 2-4).



Figure 2-4: Tawella Valley, facing south (2012)

2.2.2.6 Ballkha Valley

This valley starts above Ballkha Village at 1,708 m ($35^{\circ}12'31''\text{N}$, $46^{\circ}09'46''\text{E}$) towards the southern part of the area and ends near Darashesh (Fig. 2-5).



Figure 2-5: Ballkha Valley, facing south (2012)

2.2.3 Foothills zone

This zone starts from base of the mountain zones and stretches to the plain zone. It consists of two main foothills:

- 1- The foothills located between Hawraman and Shnirwe-Bafre Mere Mountains Subzone and start from Darga Shexan Village towards Derashish, Kharpani, Khargellan and Gulp villages and include

Tlawar, Damarakolan, Ahla, Khargellan and Zardahal and Asnawar foothills (Fig. 2-6).



Figure 2-6: Part of the foothills lying between Hawraman and Shnirwe-Bafre Mere, facing southwest (2013)

- 2- The foothills lying in the Sharazoor, such as Grdagrre, Chaqalawa, Tappi Safa, Tapa Tolaka, and Tapa Gulawi foothills.

2.2.4 Sharazoor Land

It is located between Hawraman Mountain from the east and northeast and Shnirwe Mountain from the south and southeast, and Darbandikhan Lake from the west (Fig. 2-7).



Figure 2-7: Sharazoor foothills and Drabandikhan Lake from western side, facing southwest (2013)

2.2.5 Water sources

There are two main water sources in Hawraman region:

2.2.5.1 Zallm River

It originates from Zallm spring and is considered one of the largest springs in Sharazoor area. The spring mouth is semicircular and gushes out from a small cave located about 22 m above the base of a vertical cliff (Ali and Ameen, 2005) and runs from Hawraman Mountain northeast of the site towards the Tanjero and Darbandikhan Lake (Ararat et al., 2009).

2.2.5.2 Streams

There are many streams in Hawraman region that are considered its main source of water for both drinking and agriculture. Examples are:

2.2.5.3 Sargat Stream

It is located above Sargat Village between $35^{\circ}18'02''$ – $35^{\circ}18'14''$ N and $46^{\circ}07'13''$ – $46^{\circ}07'38''$ E and flows as small springs towards Sargat Village.

2.2.5.4 Biyara Stream

This is located in the valley between Biyara from the Iraqi side and Hanai Garmala from the Iranian side between $35^{\circ}13'52''$ – $35^{\circ}14'33''$ N and $46^{\circ}07'13''$ – $46^{\circ}08'34''$ E (Fig. 17).

2.2.5.5 Ballkha Stream

It runs along the valley above Ballkha village between $35^{\circ}12'25''$ – $35^{\circ}12'35''$ N and $46^{\circ}09'35''$ – $46^{\circ}09'42''$ E and flows toward Hawar Village.

2.2.5.6 Tawella Stream

This stream flows between Tawella Village (Iraq) and Zawer Village (Iran) between $35^{\circ}12'05''$ – $35^{\circ}12'59''$ N and $46^{\circ}11'14''$ – $46^{\circ}13'35''$ E and merges with Ballkha stream before Hawar Village.

2.2.5.7 Darashesh Stream

This stream flows from above Darashesh Village between $35^{\circ}11'25''$ – $35^{\circ}12'05''$ N and $46^{\circ}03'28''$ – $46^{\circ}03'37''$ E.

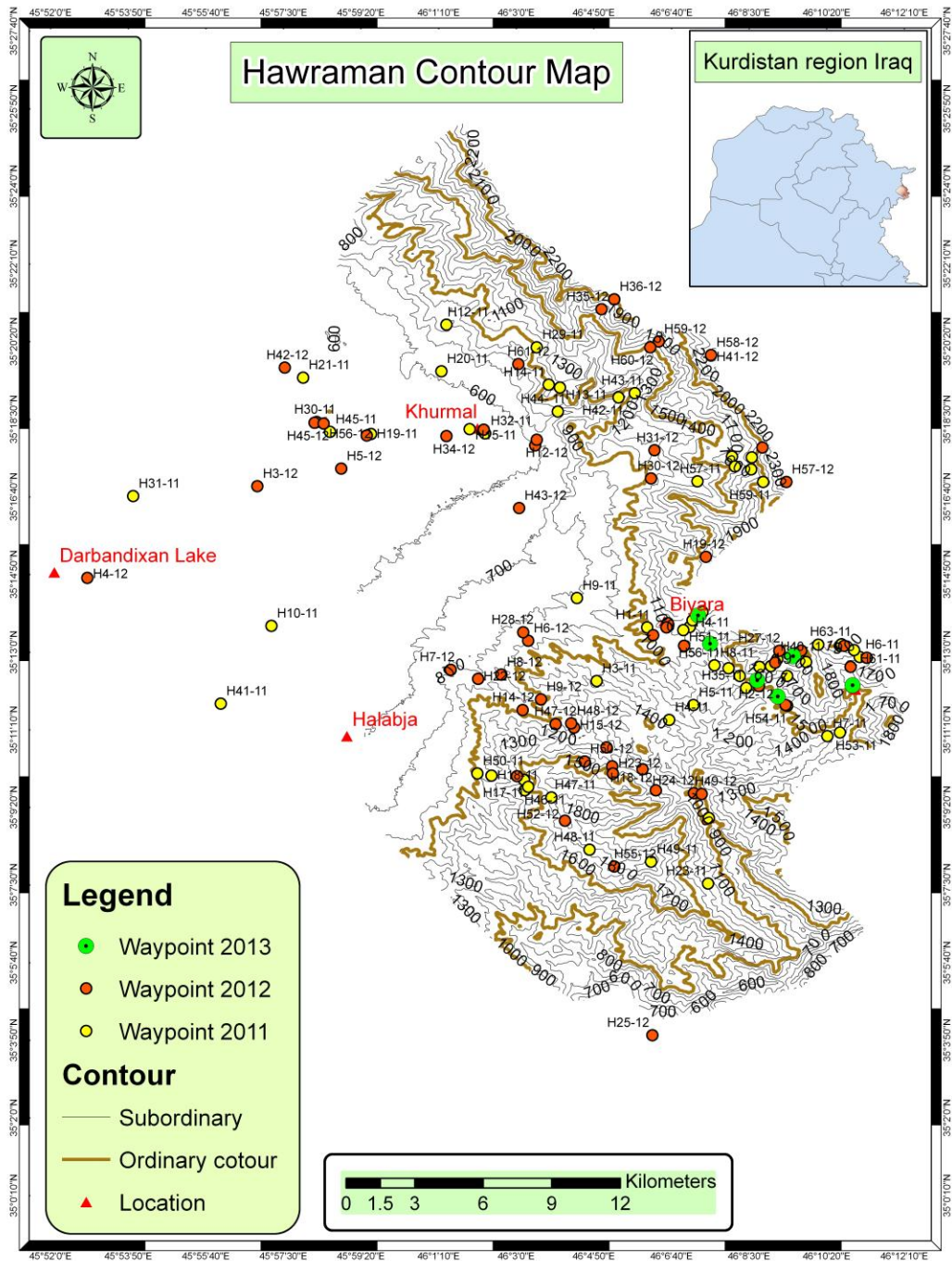


Figure 2-8: Contorean map of Hawraman Mountain

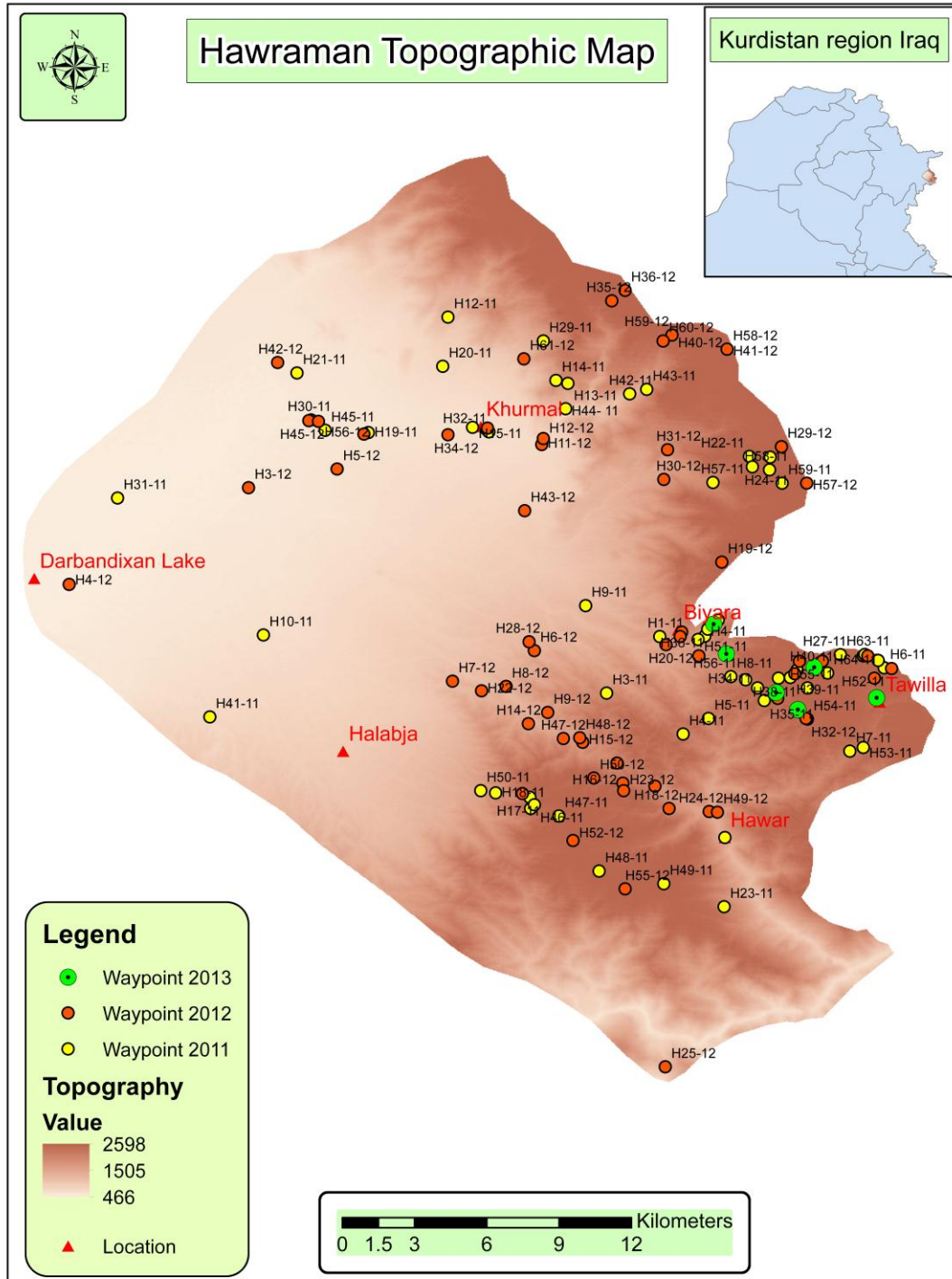


Figure 2-9: Topographic map of Hawraman Mountain

3. CHAPTER THREE

Geology of Hawraman Area

The studied area is located within the Western Zagros Fold-Thrust Belt (Musher et al., 2007). Hawraman Formation, introduced by Bolton (1958, in Buday, 1980), consists of a sequence of light-colored, thick-bedded, partly crystalline limestone with interbeds of marly limestone. Bolton mentioned that the age of Hawraman Formation goes back to the Upper Triassic (Carnian and Noric) and that it has a thickness of about 600 m. Aside from Bolton's proposed formation, there are no other defined formations within the tectonic subdivision of Iraq.

Jassim et al. (1987) indicated that Hawraman outcrops, coincide with the Iraq-Iran border (Fig. 3-1). The outcrops in Iraq are located north of the towns of Said Sadiq, Khurmali, and Tawella (Karim, 2006). According to Said and Goff (2006), Hawraman Mountain is part of the Qulqula-Khwakurk zone that consists of the following Subzones:

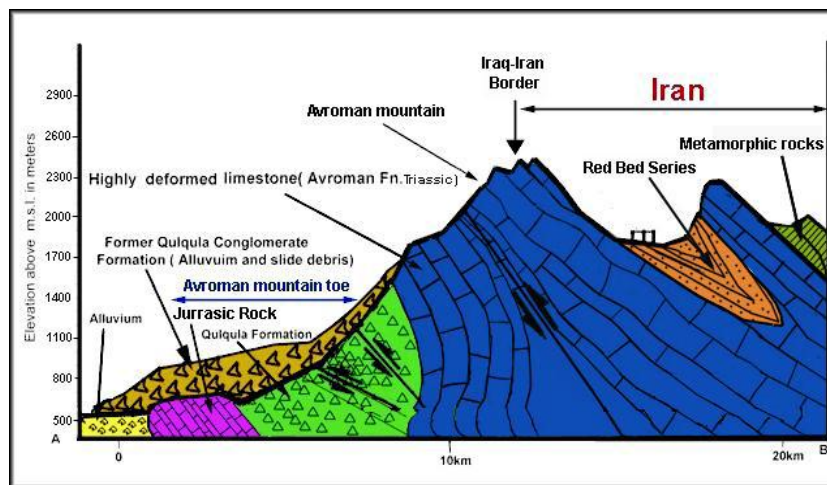


Figure 3-1: Geological cross section of the Hawraman Mountain inside Iraq and Iran (modified From Ali and Ameen, 2005)

3.1 Biyara Limestone

This type of Subzone is known only from Qulqula-Khwakurk zone east of Halabja near Biyara village. It occurs as imbricates up to 20 m thick within the Qulqula Radiolarian Formation.

3.2 Avraman Limestone

It is a highland of Avraman (Hawraman) located northeast of Halabja. It forms a northeast-southeast trending mountain range following the border between Iraq and Iran between Said Sadiq and Tawella. This Subzone is 800 m thick and consists of light grey brownish, sometimes milky white, thick-bedded to massive hard limestone. The biostratigraphy of the Avraman limestone was evaluated into outcrops in the Zallm Valley, Bani Shar, and Kani Seif areas. (Fig 3-2)



Figure 3-2: Hawraman Formation above Darimarr facing south (2013)

3.3 Qulqula Group

This consists of four divisions.

3.3.1 Shallow-water carbonate

This division is about 120 m thick and exposed near Tawella Village in the southeast part of Iraqi Hawraman range. It comprises light grey, locally nodular and oolitic with pyritised coprolites fossils of *Favreina* sp., and the limestone contains green algae fossils.

3.3.2 Carbonate-chert sequence

This middle unit (Valanginian-Early Aptian) comprises white-grey limestone rich in bioclasts and often containing stylolites.

3.3.3 Offshore southern Neo-Tethys radiolarian chert (Aptian-Albian)

The uppermost and the thickest unit of the formation is of Aptian-Albian age deposited in a deep-water environment.

3.3.4 Qulqula Conglomerate Formation

It consists of thick lenticular beds of conglomerates, composite of pebbles and small boulders of limestone, and to a lesser extent of chert. Thickness of the Qulqula conglomerate formation is about 1,200 m in the type area, 1,400 m in Naorbab area, and 500 m in the Halabja area. (Fig. 3-3)



Figure 3-3: Conglomerate formation above Ahmad Awa, facing south (2013)

3.4 The Lower Balambo Formation

It is a separate formation from the Qulqula-Khuakurk formation and includes the Shnirwe and Bafre Mere Mountains Subzone. According to Bellen et al. (1959), this formation was described by Wetzel in 1947 from the Sirwan Valley near Halabja, and it comprises thin-bedded blue ammonitiferous limestones with intercalation of olive green marls and dark blue shales (Kassab and Jassim, 1980). (Fig 3-4)

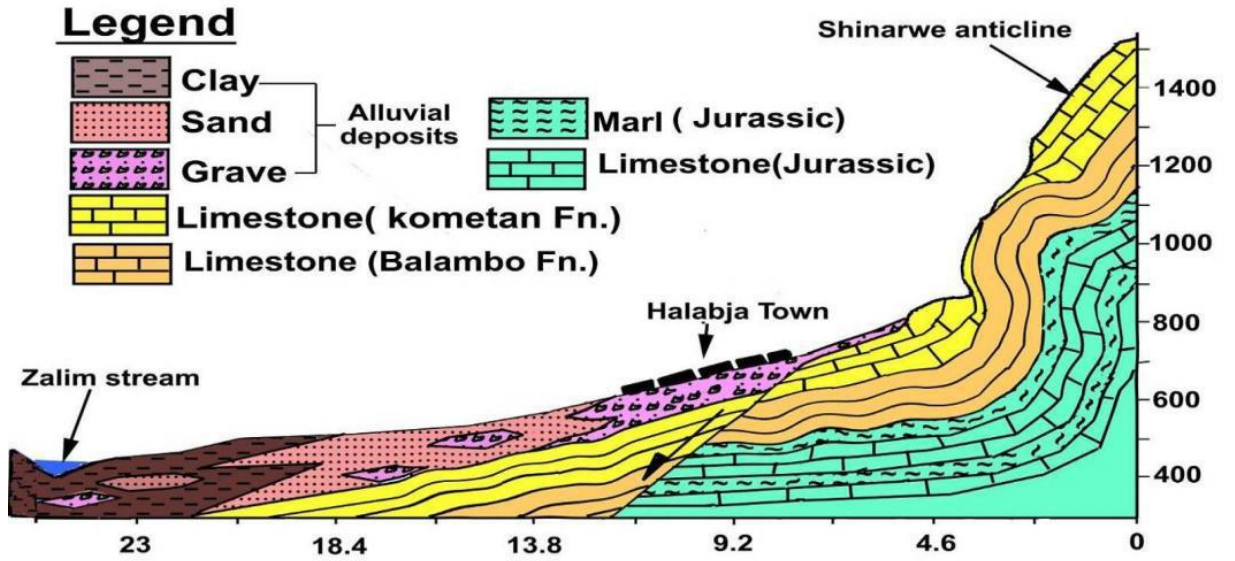


Figure 3-4: Simplified geologic cross section of Shinarwe Mountain that passes through Halabja town (Ali, 2007)

4. CHAPTER FOUR

Materials and Methods

The present research is based on a three-year (2011, 2012 and 2013) intensive study of the plants of Hawraman area in the field, libraries, and herbaria inside and outside Iraq. All specimens collected during the field study were identified, numbered, classified, and deposited in the herbarium of the Faculty of Agriculture, Sulaimani University (SUFA). Specimens housed in other herbaria, such as the National herbarium of Iraq (BAG), the Baghdad University herbarium at the College of Science (BUH), Royal Botanical Gardens, Kew (K), Royal Botanical Garden Edinburgh (E), and Natural History Museum in London (BM), were also studied, verified, and compared with the specimens collected during this study.

The identification process depended on the available floras, journals, scientific papers, plant field guides, and dissertations pertinent to the flora of Iraq and neighboring countries.

During this study about 3,500 specimens were collected at 135 waypoints on 33 trips each of which lasted two to three days. In order to avoid repetition and confusion during data collection, each species in a given collection was given a unique number of a continuous series. For each collection number, coordinates (longitude and latitude), altitude, date, exact locality, and ecological information were recorded.

Because of the tremendous altitudinal variation and diverse vegetation in Hawraman Mountain, special attention was given to collect plants from all areas at different seasons to ensure the availability of both flowering and fruiting stages for the correct identification of all samples, and thousands of plant specimens were collected from different parts of the mountain and in different seasons from both series of mountains subzones Hawraman and Shnirwe-Befri Meeri (including highest peaks, plains, wetlands, foothills, and riverians). In all, approximately 135 localities (wayopoints) were surveyed and about 3,500 specimens were collected from March 2011 to May 2013. All specimens are deposited in the herbarium of Sulaimani

University/Faculty of Agriculture (SUFA; acronym follows <http://sciweb.nybg.org/science2/IndexHerbariorum.asp>).

This investigation covered all vascular plants within the study area, including those collected by earlier botanists. The study also covers additional information, such as local names, ethnobotanical uses (e.g., food, medicine, tools, fibers, ornaments, flavors, drinks, and condiments), and colloquial benefits of the plant to native inhabitants of Hawraman.

Plant profiles:

After collecting at each waypoint, photographic plant profiles were made for most species in that area. To make a profile, a suitable place was chosen where there was enough light to allow for good-quality images, then all the plant parts were placed on a black fabric used as the background. From each waypoint, several plants of a given species were collected to compare their variation in Hawraman. One of the most important benefits of profiling is to obtain close-ups of fresh material and use it subsequently in the identification. For profiling the following instruments and tools were used, Canon G12 camera, anatomy dissection kit, tape measure to provide a scale, a black piece of fabric as background, photo umbrella to provide shade, tripod, and sometimes a dissecting microscope or a hand lens to dissect tiny flowers or fruits. After profiles were taken, the photographs of each plant species was saved in different folders and labeled (name of place, waypoint, and date of collection). All data collected during this survey were entered into an excel spreadsheet and then moved to an access 2007 database named the Flora of Hawraman.

In addition to the standard references on the flora of Iraq (Guest & Rawi, 1966; Townsend & Guest, 1974, 1980; Townsend et al., 1966, 1968, 1985). Iraq and Iran (Rechinger, 1963-2012), Syria (post, 1932), and Turkey (Davis, 1964-1988; Guner et al., 2000), several unpublished thesis (e.g., Abd-Al-aziz; Al-Sindy, 2011; Amer, 2003; Babashek, 2006; Faris, 1983; Haeder, 2003; Khalaf, 1980) were consulted.

5. CHAPTER FIVE

Results and Discussion

The following list covers all vascular plant species of Hawraman. It is based on collections made during the current study from March 2011 to May 2013, as well as on distributions in volumes of the Flora of Iraq and Flora Iranica and on collections of herbariums inside and outside of Iraq. The total species count this study covers is 1140 taxa of which 951 was collected in current study.

For easy referencing, an alphabetic arrangement of all taxa was used from the family to the variety ranks. Family limits and generic placements follow Mabberley (2008) and the Angiosperm Phylogeny Website (<http://www.mobot.org/MOBOT/research/APweb>). Name abbreviation of authors of plant names follow the International Plant name Index (IPNI)-(see P 268)

The signs and letters followed the scientific names provide information about each taxon. They include in their order of listing:

New records: (*) for taxa recorded for the first time during the present study for Hawraman, (**) for taxa new for Iraq, and (***) for taxa new to sciences.

Duration: (a) for annual plants, (b) for biennial plants, and (p) for perennial plants.

Frequency in the field: (c) common, (o) occasional, (f) frequent, (r) rare, and (vr) very rare.

Reproductive status: (fl) flower and (fr) fruit.

Distribution: (m) for other mountain districts in Kurdistan region of Iraq, (I) for Iran, (S) for Syria, (T) occurrence of the species in Turkey.

Following the above symbols, the numbers 11, 12, and 13 indicate the collection years 2011, 2012, and 2013, respectively. Each of these years is following by locality data (waypoints) provided in Table xx.

In addition to the gatherings made from Hawraman in this study, collections cited in the Flora of Iraq and/or Flora Iranica are listed under the heading “Other collections:” in which localities, collectors, collection numbers, and herbaria housing these collections are given. Furthermore, brief notes follow some taxa of interest, and complete descriptions are provided for species reported herein for the first time from Iraq

1. Family ACANTHACEAE

This family is represented in Hawraman by one genus and one species new to the mountain.

1. *Acanthus dioscoridis* L. (Fig. 5-1)

(* , P, O, Fl, Fr, M, I, S, T): 11(1477), 2012(396), 12(763),
12(977), 12(1489).



Figure 5-1: *Acanthus dioscoridis* L.

2. Family ACERACEAE

This family is represented in Hawraman by one genus and one species

2. *Acer monspessulanum* L.

(P, C, Fl, Fr, M, I, S, T): 11(94), 11(325), 11(506), 11(546),
11(613), 11(976), 11(1107), 11(1411), 11(1446), 12(394),
12(725).

Other collections: Kamarspa, *Rawi 22691* (BAG, K); Halabja, *Rawi 8950* (BAG, K); N of Biyara, *Gillett 11774* (BAG, K); near Tawella, *Rechinger 10258* (BUH, W).

Murray and Rechinger (1969) placed the above collection from Tawella in subp. *assyriacum* (Pojark.) Rech.f., whereas Jeffrey (1980) did not recognize any infraspecific taxa.

3. Family ADOXACEAE

The family is represented in Hawraman by a single genus and one species.

3. *Sambucus ebulus* L.

Other collections: Hawraman and Shahu, Haussknecht s.n. (JE).

It is uncertain if the species was collected at Hawraman of Iraq or Iran.

4. Family ALISMATACEAE

This family is represented in Hawraman by one genus and one species new to the mountain.

4. *Alisma lanceolatum* With. (Fig. 5-2)

(* , A, Vr, Fl, Fr, I, S): 11(1159), 2012(1594).

This species grows in marshy places, in shallow water, small streams, and seepage pools. It is very rare, and occupies an area with a small population of not more than 50 plants.

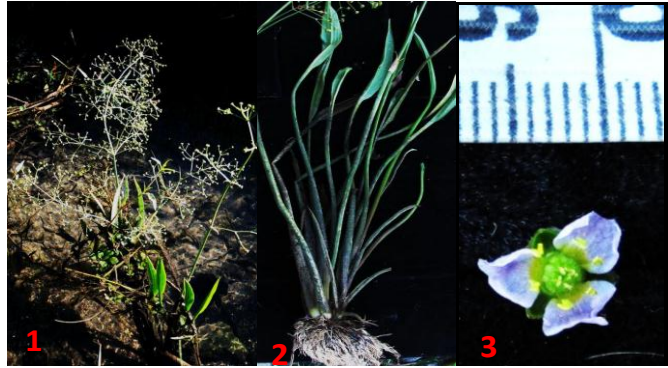


Figure 5-2: *Alisma lanceolatum* With. 1. Habit. – 2. Leaves. – 3. Flower

5. Family ALLIACEAE

This family is represented in Hawraman by one genus and 11 species, of which four are new to Hawraman.

5. *Allium affine* Ledeb.

(* , P, R, Fl, M, I, S, T): 11(1480), 11(1554), 12(488), 12(1399),

12(1149), 12(1537).

6. *Allium akaka* Gmelin

(P, O, Fl, M, I, T): 11(593).

Other collections: Hawraman, *Gillett 11892* (BAG, K).

7. *Allium ampeloprasum* L.

(* , P, O, Fl, M, I, S, T): 11(1320), 11(1387), 11(1432), 12(1219),

12(1259).

8. *Allium chrysantherum* Boiss.

(* , P, O, Fl, Fr, M, I, S, T): 11(1140), 11(1157), 11(1454),

12(737).

9. *Allium jesdianum* Boiss. & Buhse

(P, C, Fr, M, I, S, T): 11(1485), 12(1086).

Other collections: Hawraman, *Gillett 11868* (BAG, K).

10. *Allium macrochaetum* Boiss. & Hausskn.

Other collections: Khurmall, *Hadač 5058* (BUH, PR).

11. *Allium paniculatum* L.

(P, O, Fl, M): 11(239).

Other collections: 10 km W of Tawella from Halabja, *Rawi 22138* (BAG, K); Tawella, *Rawi 21863* (BAG, K).

12. *Allium phaneranthrum* Boiss. & Hausskn.

(P, O, Fl, M, I, T): 12(867), 12(1091).

Other collections: Khurmall, *Hadač 5058* (BUH, PR).

13. *Allium qaradaghense* Feinburn

(P, R, Fr, M, I): 11(1541), 12(1435), 12(1257).

This species is endemic to Kurdistan Iraq and Iran.

14. *Allium scabriscapum* Boiss. (Fig. 5-3).

(* , P, Vr, Fl, Fr, M, I): 12(517), 12(1115).

This species grows in dry places on limestone mountain slopes in oak forests and subalpine areas at 1,400–2,200 m.

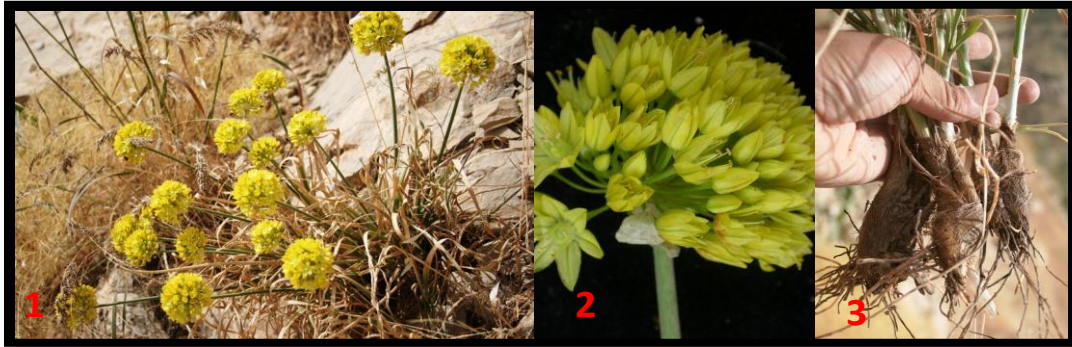


Figure 5-3: *Allium scabriscapum* Boiss. 1. Habit. – 2. Inflorescence. – 3. bulbs with outer tunics reticulate-fibrose

15. *Allium stamineum* Boiss.

(P, O, Fl, M, I, T): 12(508).

Other collections: Kamarspa, *Rawi* 22193 (BAG, K); Susakan, *Rechinger* 10148 (BUH, W).

6. Family AMARANTHACEAE

This family is represented in Hawraman by five genera and nine species, of which six are new to Hawraman.

16. *Amaranthus albus* L.

(* , A, F, Fl, Fr, M, I, S, T): 11(1629).

17. *Amaranthus graecizans* L.

(* , A, F, Fl, M, I, S, T): 11(1371), 11(1398), 12(913).

18. *Amaranthus hybridus* L.

(* , A, F, Fl, M, I, S, T): 11(1316), 11(1484), 12(829), 12(914).

19. *Amaranthus* sp.

(A, F, Fl): 11(1132).

20. *Atriplex lasiantha* Boiss.

(* , R, Fl, M, I, T): 12(1351).

21. *Beta vulgaris* L.

(* , A, Fl, Fr, I, S, T): 12(1455).

This is a cosmopolitan species cultivated worldwide for its leafy fleshy roots (sugar beet) and leafy forms (Swiss chard). It is also known to escape from cultivation but has not yet been reported as weedy in Iraq.

22. *Chenopodium opulifolium* Schrader ex Koch & Ziz.

(* , A, F, Fl, Fr, M, I, S, T): 11(1279), 12(825), 12(912).

23. *Noaea mucronata* (Forssk.) Aschers. & Schweinf.

(* , P, F, Fl, Fr, M, I): 11(1248), 11(1601), 12(1105), 12(1293),
12(1449), 12(1475).

24. *Salsola canescens* (Moq.) Boiss.

(P, Vr, Fl, M, I, T): 12(1474).

Other collections: Hawraman, *Rawi et al.* 19753, 19796 (BAG, K).

25. *Salsola* sp.

(P, R, Fl): 12(1104).

7. Family ANACARDIACEAE

This family is represented in Hawraman by two genera and three species.

26. *Pistacia eurycarpa* Yalt. (Fig. 5-4: 1)

(P, C, Fr, M, I, S, T): 11(269), 11(533), 11(753), 11(821),

11(1243), 11(1444), 12(310), 12(353), 12(375).

Other collections: Tawella, *Rechinger 10268* (BUH, W); above Biyara, *Gillett 11796* (BAG, K).

27. *Pistacia khinjuk* Stocks (Fig. 5-4: 2)

(P, O, Fr, M, I, S, T): 11(724), 12(843).

Other collections: Hawraman, *Hausknecht s.n.* (JE).



Figure 5-4: 1. *Pistacia eurycarpa* Yalt. – 2. *Pistacia khinjuk* Stocks

28. *Rhus coriaria* L.

(P, C, Fr, M, I, S, T): 11(803), 11(1422), 13(108).

Other collections: Tawella, *Rechinger 10213* (BUH, W).

8. Family APIACEAE (UMBELLIFERAE)

The family is represented in Hawraman by 31 genera and 60 species, of which 17 are reported for the first time for Hawraman and one new to Iraq.

29. *Ainsworthia trachycarpa* Boiss.

Other collections: Khurmall, *Hadač 5041* (BUH, PR).

30. *Ammi majus* L.

(* , A, O, Fl, M, I, S, T): 12(190), 12(708).

31. *Anethum graveolens* L.

(A, O, Fl, Fr, I, S, T): 11(1278), 12(822), 12(1454).

Other collection: Halabja, *Nuri and K. Hamed 41206* (BAG, K).

32. *Anthriscus cerefolium* (L.) Hoffm.

(A, C, Fl, Fr, M, I, T): 11(28), 11(192), 11(720), 11(833), 12(365).

33. *Apium nodiflorum* (L.) Lag.

(* , P, Fl, O, M): 11(1532).

34. *Artemisia squamata* L.

(A, C, Fl, M): 2012(289).

Other collections: near Tawella, *Rechinger 10145* (BUH, W); Khurmall, *Hadač 5050* (BUH, PR); 5 km S of Tawella, *Rawi 21832* (BAG, K)

Hadač 5050 was also cited under *Pragnos ferulacea* by Herrnstadt and Heyn (1987).

35. *Bunium cornigerum* (Boiss. & Hausskn.) Drude

Other collections: near Tawella, *Rechinger 12371* (BUH, W); between Halabja and Tawella, *Rawi 22260* (BAG, K).

36. *Bunium elegans* (Fenzl) Freyn

Other collections: Tawella, *Rechinger 10282* (BUH, W); Khurmall, *Hadač 5044* (BUH, PR).

37. *Bunium rectangulum* Boiss. & Hausskn.

(* , P, R, Fl, I): 13(23).

This is the second collection of the species from Iraq. The previous collection was made from Mt. Bradost near Shanaidar.

38. *Bupleurum aleppicum* Boiss.

(* , A, Vr, Fl, I, S, T): 11(907), 13(89).

39. *Bupleurum croceum* Fenzl

Other collections: Tawella, *Rechinger 12372* (BUH, W).

Above is the single collection known thus far from Iraq.

40. *Bupleurum gerardii* All.

Other collections: Tawella, *Rawi 21910* (BAG, K).

41. *Bupleurum lancifolium* Hornem var. *heterophyllum* (Link) Boiss.

(* , P, O, Fl, Fr, M, I, S, T): 11(1478), 11(1548), 12(1510), 12(1590).

42. *Chaerophyllum crinitum* Boiss.

(* , P, O, Fl, Fr, M, I, T): 11(187), 11(342), 11(867), 12(275), 12(434),

12(483), 12(589), 12(668), 12(720), 12(875), 12(1133).

43. *Chaerophyllum macropodium* Boiss.

(P, O, Fl, Fr, M, I, T): 11(844), 12(327), 12(972), 12(1004).

Other collections: near Tawella, *Rechinger 10271* (BUH, W), *Rawi 21902*, *22288* (BAG, K); Damar, *Gillett 11845* (BAG, K); 2 km NE Balka, *Rawi et al. 29545* (BAG, K).

44. *Daucus carota* L.

(P, O, Fl, Fr, I, S, T): 12(1207).

45. *Eryngium billardieri* F. Delaroché

(P, O, Fl, M, I, T): 11(710), 11(1505), 12(1375), (1380), 12(1469),
12(1494).

46. *Eryngium creticum* Lam. (Fig. 5-5)

(* , P, O, Fl, M, I, T): 11(1139), 11(1144), 11(1177).

47. *Eryngium pyramidale* Boiss.

(* , P, R, Fl, M, I, S, T): 12(1551).

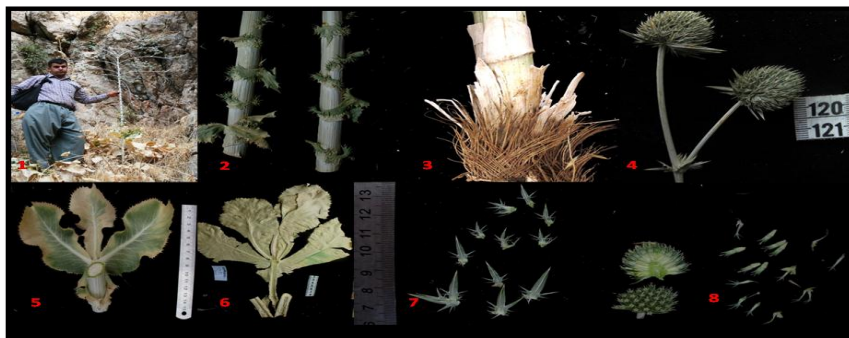


Figure 5-5: *Eryngium pyramidale* Boiss. 1. Habit. – 2. Part of stem. – 3. Basal part of stem. – 4. Basal leaf. – 5. Cauline leaf. – 6. Inflorescence. – 7. Involucral bract. – 8. Flower.

48. *Eryngium thyrsoideum* Boiss.

(P, C, Fl, Fr, M, I, S, T): 11(1117), 11(1555), 11(1563), 11(1579),
13(1588), 12(157)12(509), 12(1132), 12(1244), 12(1264), 14(1448),
12(1561), 12(1592).

Other collections: near Tawella, *Rechinger 10224* (BUH, W); bove
Khurmall, *Hadač 5035* (BUH, PR).

49. *Falcaria vulgaris* Bernh.

(P, R, Fr, M): 12(1224).

Other collections: Kani Spi, near Tawella, *Rechinger 10394* (BUH, W); 8
km N of Kani Spi, *Rawi 22391* (BAG, K).

50. *Ferula haussknechtii* Wolff ex Rech.f. (Fig: 5-6)

(P, Vr, Fl, M, I, T): 12(694).

51. *Ferula orientalis* L.

(* , P, Vr, Fr, M, I, T): 12(437), 12(1385).



Figure 5-6: *Ferula haussknechtii* Wolff ex Rech.f.

Other collections: N of Biayra, *Gillett 11785* (BAG, K).

52. *Ferula shehbaziana* S.A.Ahmad, sp. nov. TYPE: Iraq, Kurdistan, Sulaimani Province, Hawraman, summit of Rangin Mt., ca. 10 m from Iraq- Iran border, 35°21'20"N, 46°05'19"E, subalpine zone, between rocks and among grasses, 2004 m, 8 June 2012, *Saman A. Ahmad 12-960* (holotype, SUFA; isotype, SUFA). (Fig: 5-7)

(***, P, Vr, Fl): 12(960).

Perennial herbs, glabrous and glaucous throughout. Stems 2.5–3 m tall, erect, solid, not striate, branched and somewhat flexuous distally. Basal leaves 60–75 × ca. 30 cm, 4- or 5-ternate; ultimate segments linear, 3–4 cm × 1–2 mm, glaucous, adaxially grooved; uppermost cauline leaves 1- or 2-ternate; petiolar sheathing base strongly vaginate, amplexicaul, coriaceous, inflated, 8–15 × 6–8 cm, glabrous, glaucous. Umbels without involucre or involucl, principal rays 8–10, 2–4 cm; ultimate umbels densely 8–10-flowered. Flowers yellow, ca. 1 mm; ovary glabrous. Mature fruits unknown.

Ferula shehbaziana is closely related to *F. oopoda* (Boiss. & Bushe) Boiss. (Afghanistan, Iran, Iraq, Pakistan) and to *F. macrocolea* (Boiss.) Boiss. (W Iran). From the former, it differs by having taller, non-sulcate stems, considerably larger upper leaf vagina (8–15 vs. ca. 5 cm), and umbels with fewer rays (8–10 vs. 16–25). From *F. macrocolea*, the new species differs by having distinctly taller (2.5–3 vs. 0.3–0.6 m) and smooth (vs. sulcate) stems, much larger and 4- or 5-ternate (vs, 3-ternate) basal leaves, much smaller vagina (8–15 vs. ca. 2 cm) of upper leaves, and 8–10 (vs. 3 or 4) principal umbel rays. Unfortunately, little can be said about the fruits and

flowers of this novelty, though the characters above are considerably distinct to easily distinguish it.

This is an immature plants representing a species unknown to Hawraman, and further collections are needed to establish its identity.



Figure 5-7: *Ferula shehbaziana* S.A.Ahmad

53. *Ferulago bracteata* Boiss. & Hausskn.

(* , P, Vr, Fl, M, I): 12(1118), 12(1356), 12(1518), 12(1542).

This very rare endemic of Kurdistan Iraq and Turkey is indistinguishable from Qopi Qaradagh plants described by Townsend (Kew Bull. 20:79. 1966) as *Ferulago abbreviate* C.C.Towns., a name treated by Chamberlain (in Rechinger, 1987) as a synonym of *F. bracteata*.

54. *Ferulago angulata* (Schlecht.) Boiss.

(* , P, C, Fl, Fr, M, I, T): 11(203), 11(549), 11(835), 12(761), 13(52).

55. *Ferulago macrocarpa* (Fenzl) Boiss.

(* , P, C, Fl, Fr, M, I, S, T): 11(739), 11(786), 12(479), 12(867), 12(1230).

56. *Ferulago stellata* Boiss.

(P, C, Fl, Fr, M, I, T): 11(561), 11(834), 11(1482), 11(1597), 12(254),
12(410) 12(662), 12(1030), 12(1519).

Other collections: near Tawella, *Rechinger 10351* (BUH, W); Hawraman, *Gillett 11756, 11786* (BAG, K), *Rawi 29356* (BAG, K).

57. *Foeniculum vulgare* Mill. var. *dulce* Mill.

(P, F, Fl, M, I, S, T): 11(1543), 12(1454).

58. *Grammosciadium scabridum* Boiss.

(P, R, Fl, M): 11(517).

Other collections: near Tawella, *Rechinger 12437* (BUH, W).

59. *Hellenocarum amplifolium* (Boiss. & Hausskn.) Klyukov

(B or P, O, Fl, Fr, M, I): 11(535), 11(1325), 12(736), 12(840),
12(1111).

Other collectins: Avroman mts. above Khormal, *Hadač 5022*, Hawraman, *Hausskn. s.n.*

60. *Heracleum persicum* Desf. ex Fisch. (Fig. 5-8)

(**, P, Vr, Fr, I, T): 11(1510), 13(87).

Description: Plants perennial, pubescent. Stems 1.5–2 m tall, 1.5–2.5 cm in diam. below, sulcate, ± sparsely hirsute. Lower leaves 1–1.5 m long, 1-pinnate, lamina over 40 cm long, glabrous above, puberulent below; leaflets 2–5, sessile or short petiolate, pinnately divided into ovate to lanceolate, bluntly serrate dentate lobes; upper cauline leaves oblong-ovate, with ± inflated, retuse sheaths. Umbels with 20–50 unequal rays, minutely pubescent to glabrous, 3–16 cm long; bracteoles linear-lanceolate,

acuminate, numerous. Flowers white, outer one radiant; petals sparsely pubescent outside ovary hirtellous. Fruits cuneate. obovate, 9–12 x 5–8 mm, densely pubescent to villosulous; dorsal vittae clavate; stylopodium broadly conical; style twice as long as stylopodium.

Habitat: It is growing under walnut trees, beside the stream, shady place.

Distribution: Very rare species, there is one small population in Hawraman. This is the first record of the species from Kurdistan and whole Iraq. The species is known in western Iran and southeastern Turkey.

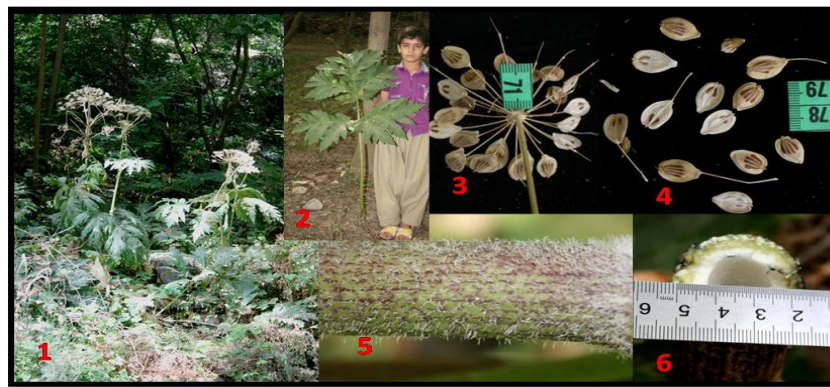


Figure 5-8: *Heracleum persicum* Desf. ex Fisch. 1. Habit. – 2. Basal leaf. – 3. Part of inflorescence. – 4. Fruit. – 5. Stem indumentum. – 6. Section in lower part of stem

61. *Johrenia aromatica* Rech.f.

(* , P, F, Fl, M, S, T): 11(109), 11(293).

62. *Lagoecia cuminoides* L.

Other collections: Khurmalll, *Hadač 5064* (BUH, PR).

63. *Malabaila secacul* (Mill.) Boiss. subsp. *aucheri* (Boiss.) C.C.Towns.

(P, R, Fr, M, I, T, I): 12(936).

Other collections: near Tawella, *Rechinger 10288* (BUH, W).

64. *Muretia amplifolia* Boiss. & Hausskn.

Other collections: Khurmall, *Hadač 5022* (BUH, PR).

65. *Petroedmondia syriaca* (Boiss.) Tamamsch.

Other collections: Khurmall, *Hadač 5067* (BUH, PR).

66. *Physocaulis nodosus* (L.) W.D.Koch

Other collections: near Tawella, Rechinger 10153 (BUH, W); 7 km W of Tawella near Balka, *Rawi 21850, 22356* (BAG, K).

67. *Pimpinella affinis* Ledeb.

(* , O, Fl, M): 12(351).

68. *Pimpinella anthriscoides* Boiss.

Other collections: Hawraman, *Haussknecht s.n.* (JE).

69. *Pimpinella eriocarpa* Banks & Sol.

(A, O, Fl, M, I, S, T): 11(450).

Other collections: above Khurmall, *Hadač 5061* (BUH, PR); Susakan, *Rechinger 10134, 10178* (BUH, W).

70. *Pimpinella kotschyana* Boiss.

(P, O, Fl, Fr, M, T, I): 11(1184), 12(1019), 12(1301).

Other collections: between Khurmall and Halabja, *Hadač 5077* (BUH, PR).

The species was first collected from Hawraman by Haussknecht, and his collection is the type specimen of *Pimpinella haussknechtii* Rech.f. and H. Riedl, a synonym of *P. kotschyana*.

71. *Pimpinella olivieri* Boiss.

(* , P, O, Fl, M, S, T): 12(493).

72. *Pimpinella peregrina* L.

(* , O, Fl, Fr, M, I, S, T): 11(866), 11(919), 11(1311), 11(1524),
12(179).

73. *Pimpinella saxifraga* L.

(P, Vr, Fl, Fr, M): 12(414).

Other collections: near Tawella, *Rechinger 10371* (BUH, w).

74. *Pimpinella tragium* Vill. subsp. **pseudotragium** (DC.) Matthews

(P, O, Fl, M): 11(1600), 12(670), 12(1073).

The species is quite variable and has been divided into at least five subspecies, of which three grow in Qandil, Helgurd, and Sakri Sakran mountains. The above subspecies was once collected by Haussknecht from Hawraman at 1500–2100 m.

75. *Pragnos ferulacea* (L.) Lindl.

Other collections: near Tawella, *Rechinger 10363* (BUH, W); above Daramar, Gillett 1183 (BAG, K); Khurmali, *Hadač 5050* (BUH, PR).

Hadač 5050 was also cited under *Artemisia squamata* in Flora Iranica (see above).

76. *Pragnos uloptera* DC.

Other collections: Hawraman, *Haussknecht s.n.* (JE).

77. *Scandix iberica* M.Bieb.

(A, Vr, Fl, Fr, M, I, S, T): 11(7), 11(74), 11(150).

Other collections: near Tawella, *Rechinger 12423* (BUH, W), Khurmali, *Rawi 8964* (BAG, K); 8 km N of Kani Spi, *Rawi 22410* (BAG, K).

78. *Scandix pecten-veneris* L.

(A, C, Fl, Fr, M, I, S, T): 11(476), 12(196), 12(291), 12(335).

Other collections, near Tawella, *Rechinger 12423* (BUH, W).

79. *Scandix stellata* Banks & Sol.

(A, R, Fr, M, I, S, T): 11(799), 12(343).

Other collections: near Tawella, *Rechinger 10274* (BUH, W).

80. *Smyrniopsis aucheri* Boiss.

(R, Fl, Fr, M, I, T): 11(718), 11(1033).

Other collections: Khurmall, *Hadač 5047*(BUH, PR).

81. *Smyrnum cordifolium* Boiss.

(P, O, fl, fr, M, I, S, T): 12(797).

Other collections: near Tawella, *Rechinger 10270* (BUH, W).

82. *Torilis leptocarpa* (Hochst.) C.C.Towns.

Other collections: Khurmall, *Hadač 5062* (BUH, PR).

83. *Torilis leptophylla* (L.) Rchb.

(A, O, Fl, Fr, M, I, S, T): 11(697).

Other collections: near Tawella, *Rechinger 12430* (BUH, W).

84. *Torilis nodosa* (L.) Gaertn.

(A, Fl, Fr, M, I, S, T): 11(1157), 11(1160), 11(1461), 12(1167),
12(1193).

Specimens examined: Khurmall, *Hadač 5049* (BUH, PR).

85. *Torilis stocksiana* (Boiss.) Drude

(* , A, O, Fl, Fr, M, I, S, T): 11(281), 11(470), 11(481), 11(486),
12(125), 2(253).

86. *Torilis tenella* (Del.) Rchb.

(* , A, Fl, Fr, M, I, S, T): 11(249).

87. *Turgenia latifolia* (L.) Hoffm.

(A, F, Fl, Fr, M, S): 11(695), 11(885).

Other collections: near Tawella, *Rechinger 10294 p.p.* (BUH, W).

88. *Trigonosciadium brachytaenium* (Boiss.) Alava

(** , P, Vr, Fr, M, I): 12(980), 12(1088).

Plants 35–40 cm tall, erect, densely crisped pubescent; roots fleshy, fusiform. Stems angular, strongly sulcate. Basal and lower cauline leaves upper cauline leaves similar but smaller, sessile, with strongly inflated sheath. Umbels 15–40-rayed, the rays unequal, 4.5–9.5 cm; both involucre and involucel present, reflexed, lanceolate-subulate, ciliate-villose. Flowers 28–32 per umbel. Petals pale whitish yellow, the outer sometimes radiate. Fruit obcordate to orbicular-obcordate, 9–13 × 8–10 mm, pubescent; dorsal vein filiform, unequal; stylopodium undulate-crenate.

This is the first record of the species from Iraq, though it is common in Kurdistan Iran. It grows in subalpine habitats at about 2000 m between rocks near the summit of Rangen Mt. The other two species of *Trigonosciadium*, *T. viscidulum* Boiss. and *T. tuberosum* Boiss., have simple vs. bipinnatisect leaves.

89. *Turgenia lisaeoides* C.C.Towns.

(A, F, Fl, Fr, M): 11(662), 11(884), 12(405), 12(850), 12(887).

Other collections: near Tawella, *Rechinger 10294 p.p.* (BUH, W); 7 km W Tawella, *Rawi 22340* (BAG, K); Tawella, *Rawi 21867* (BAG, K).

This species is endemic to Hawraman of Kurdistan Iraq, and it has been previously collected from Tawella and Gweja.

90. *Turgeniopsis foeniculaceae* (Fenzl) Boiss.

Other collections: Hawraman, *Haussknecht s.n.* (JE).

91. *Zosima absinthifolia* (Vent.) Link

(P, R, Fr, M, I, S, T): 12(306)

Other collections: near Tawella, *Rechinger 10240* (BUH, W).

9. Family APOCYNACEAE

This family is represented in Hawraman by three genera and three species two of which are new records for the mountain.

92. *Cynanchum erectum* L.

Other collections: Hawraman, Rawi et al. 19810 (BAG, K).

93. *Nerium oleander* L.

(* , P, F, Fl, M, I, S, T): 13(136).

A cultivated species through grwoing wild in many areas of Kurdistan.

94. *Periploca graeca* L. (Fig. 5-9)

(* , P, Vr, Fl, Fr, I, T): 12(1203).

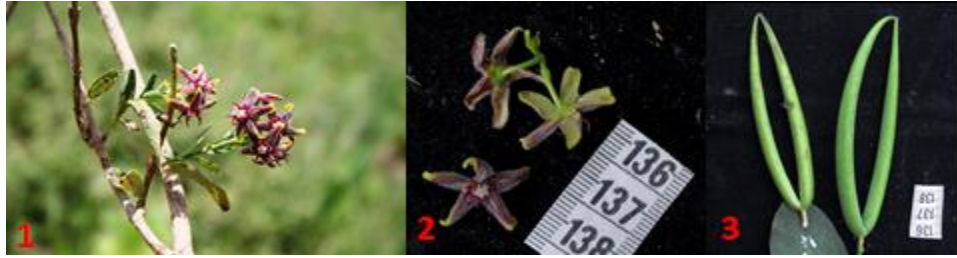


Figure 5-9: *Periploca graeca* L. 1. Habit. – 2. Flowers. – 3. Fruits

10. Family ARACEAE

This family is represented in Hawraman by two genera and five species, of which one is new to Iraq and two are new to the mountain.

95. *Arum conophalloides* Kotschy ex Schott

(P, Vr, Fl, Fr, M, I, S, T): 11(527), 12(1337), 12(1504).

Other collections: Hawraman, *Gillett 11885* (BAG, K).

96. *Arum dioscoridis* Sibth. & Sm. (Fig. 5-10).

(**, P, Vr, Fl, T): 12(730).

Description: Petiole 18–50 cm. Lamina long hastate, 13–33 x 9–25 cm. Scape 3.5–45 cm, subequal to or much shorter than petioles. Spathe 13–36 cm; tube 3–7 cm, greenish or purplish outside, whitish within, sometimes tinged pink or purple above within; lamina 8.8–25.5 × 2–9 cm, lanceolate, with ± long-acuminate apex, greenish outside (sometimes purple-tinged), stained or blotched with purple in lower 1/3–3/4 inside. Spadix 12–35 cm. Female zone 8–28 mm; lower sterile zone 2.5–10 mm; male zone 2.5–8.5 mm; upper sterile zone 1.5–8 mm, separated from male zone by (0–)2–5.5 mm gap. Sterile filaments yellow or purple, lower 2–7 mm, upper 2.5–9 mm. Appendix 6–27 cm incl. 3–60 mm stipe, suddenly expanded. into blackish-violet club.

This is the first record of the species from Iraq and Kurdistan region. The species grows on limestone mountain slopes above timberline.



Figure 5-10: *Arum dioscoridis*, 1. Habit. – 2. Spadex. – 3. Digital images of specimen

97. *Arum italicum* Mill.

(* , P, Vr, Fl, Fr, M, I, T): 11(152), 11(1317).

98. *Arum* sp.

(P, Vr): 12(717).

This is sterile plant without flower and fruits.

99. *Eminium intortum* (Banks & Sol.) Kuntze

(* , P, O, Fr, M, I, T): 11(426), 12(72), 12(102).

100. *Lemna trisulca* L. (Fig. #).

(A, F, V, M, I, T): 11(229).

Other collections: Saiyid (as Shaikh) Sadiq, on road to Halabja, Agnew *et al. s.n.* (BUH).



Figure #: *Lemna trisulca* L.

11. Family ARALIACEAE

This family is represented in Hawraman by one genus and one species.

101. *Hedera helix* L.

(P, C, V, M, I, S, T): 11(180).

Other collections: Zalem, *Rawi et al.* 29492 (BAG, K); Tawella, *Rechinger 10151* (BUH, W); Hawraman, *Hausknecht s.n.* (JE).

12. Family ARISTOLOCHACEAE

This family is represented in Hawraman by one genus and one species.

102. *Aristolochia bottae* Jaub. & Spach

(P, C, Fl, Fr, M, S, T, I): 11(130), 11(354), 11(943), 11(1001),

11(1052), 11(1211), 12(858), 12(1350).

Other collections: Halabja, *Rawi 8871* (BAG, K); Khurmali, *Rawi 8859* (BAG, K), *Rechinger 12366* (BUH, W).

13. Family ASPRAGACEAE

This family is represented in Hawraman by four genera and 16 species, of which six are new to Hawraman.

103. *Bellevalia decolorans* Bornm. (Fig. 5-11: 1)

(* , P, R, Fl, M, I): 11(142), 11(154).

104. *Bellevalia glauca* (Lindl.) Kunth

(* , P, O, Fr, M, I, T): 11(526), 12(374), 12(533), 12(805).

105. *Bellevalia longipes* Post

(* , P, F, Fl, M, I, S, T): 11(101), 11(143).

106. *Bellevalia macrobotrys* Boiss.

(* , P, C, Fl, Fr, M, I, T): 11(782), 11(785), 11(933), 11(990),
12(321), 12(823), 12(878).

107. *Bellevalia mosheovii* Feinbrum

(* , P, C, Fr, M, I, T): 11(237), 11(563), 12(372).

108. *Muscari caucasicum* (Griseb.) Baker

Other collections: near Tawella, *Rechinger 12413-a* (BUH, W).

109. *Muscari comosum* (L.) Mill. (Fig. 5-11: 2)

(P, O, Fr, M, I, S, T): 11(108), 11(716), 12(171), 12(440).

Other collections: 10 km W of Tawella on road to Halabja, *Rawi 22155* (BAG, K); Ballkha, 7 km W of Tawella, *Rawi 22361* (BAG, K); Susakan, *Rawi 21827* (BAG, K).



Figure 5-11: *Bellevalia decolorans* Bornm. 2. *Muscaria comosum* (L.) Mill

110. *Muscari tenuiflorum* Tausch

Other collections: near Tawella, *Rechinger 12413-b* (BUH, W).

111. *Ornithogalum brachystachys* C.Koch

(P, C, Fl, M, I, S, T): 11(557), 12(311), 12(318), 12(345), 12(937).

Other collections: Khurmall, *Rawi 8915* (BAG, K); near Tawella, *Rechinger 10264* (BUH, W); N of Halabja, *Rawi 22091* (BAG, K); N of Biyara, *Gillett 11814* (BAG, K).

112. *Ornithogalum kurdicum* Bornm.

Other collections: Khurmall, *Rawi 8916* (BAG, K).

113. *Ornithogalum luschanii* Stapf

(P, R, Fl, M, I, T): 11(120).

Other collections: above Darimarr, *Gillett 11863* (BAG, K).

114. *Ornithogalum persicum* Hausskn. ex Bornm.

(P, Vr, Fl, Fr, M, I, T): 11(720).

Other collections: above Darimarr, *Gillett11875* (BAG, K).

115. *Ornithogalum iraquense* Feinbrum.

(P, R, Fl):12(726).

116. *Scilla hyacinthoides* L. (Fig. 5-12)

(* , P, R, Fl, M, S, T): 11(526).



Figure 5-12: *Scilla hyacinthoides* L. 1. Habit. – 2. Bulbs. – 3. Leaf margin. – 4. Inflorescence

117. *Scilla persica* Hausskn.

(P, Vr, Fr, M): 12(1093).

Other collections: Khurmall, *Rawi 8908* (BAG, K).

14. Family ASPLENIACEAE

This family is represented in Hawraman by three genera and three species.

118. *Asplenium trichomanes* L. (Fig. 5-14: 1)

(P, O, Fl, M, S, T, I): 11(914), 11(1363), 11(1417).

Other collections: Tawella, *Rawi 21887* (BAG, K).

119. *Ceterach officinarum* DC. (Fig. 5-14: 2)

(P, O, Fl, M, S, T, I): 11(149), 11(239), 11(1088), 11(1527).

Other collections: Hawraman, *Al-Khayat et al.* 46305 (K); Zallm, *Rawi et al.* 29497 (BAG).



Figure 5-13: 1. *Asplenium trichomanes* L. 2. *Ceterach officinarum* DC.

120. *Phyllitis scolopendrium* (L.) Newm.

Other collections: Hawraman, *Hausskencht s.n.* (JE).

15. Family ASTERACEAE (COMPOSITAE)

The family is represented in Hawraman by 61 genera and 134 taxa, of which 65 taxa were recorded for the first time for this mountain and one species new for Iraq.

121. *Achillea aleppica* DC. (Fig. 5-15).

(P, F, Fl, M, I, S, T): 11(950), 11(1179), 11(1215), 12(496),

12(636), 12 (897), 12(1003), 12(1120), 12(1277).

Other collections: near Tawella, *Rechinger 10335* (BUH, W).



Figure 5-14: *Achillea aleppica* DC. 1. Habit. – 2 and 3. Inflorescence

122. *Achillea altissima* Boiss.

(* , A, R, Fl, M, I, S, T): 11(315), 11(398), 11(656), 11(672).

123. *Achillea biebersteinii* Afan.

(P, Vr, Fl, M, I, T): 11(350), 13(75).

Other collections: near Tawella, *Rechinger 10316* (BUH, W).

124. *Achillea filipendulina* Lam.

(* , P, O, Fl, M, I, T): 12(505), 12(524), 12(777).

125. *Achillea haussknechtii* Boiss. & Reut.

(A, O, Fl, Fr, M, I): 12(83), 12(284), 12(575), 12(1059), 12(1069).

126. *Achillea odontostephana* Boiss.

(A, F, Fl, M, I, S, T): 11(138), 11(147), 11(385), 1564).

127. *Achillea pseudocotula* Boiss.

(A, O, Fl, Fr, M, I, T): 11(11), 11(84), 11(99), 11(193),
11(518), 12(956).

128. *Achillea schizostephana* Boiss. & Hausskn.

(A, Vr, Fl, Fr, M): 11(972).

129. *Achillea tinctoria* L.

(P, R, Fl, M, I, T): 12(775).

130. *Anthemis haussknechtii* Boiss. & Reut.

Other collections: near Tawella, *Rechinger 10143-a/II* (BUH, W); 10 km W of Tawella, *Rawi 22149, 22924* (BAG, K).

131. *Anthemis odontostephana* Boiss. var. *tubicina* (Boiss. & Hausskn.) Bornm.

Other collections: near Tawella, *Rechinger 10284* (BUH, W); Tawella, *Rawi 21876* (BAG, K); Dara Tri, between Halabja and Tawella, *Rawi 22031* (BAG, K).

132. *Anthemis pseudocotula* Boiss.

Other collections: near Tawella, *Rechinger 10232, 10275, 12352* (BUH, W), *Rawi 21895, 22371* (BAG, K).

133. *Anthemis schizostephana* Boiss. & Hausskn.

Other collections: Susakan, *Rechinger 10143-a/I* (BUH, W); Dara Tri, between Halabja and Tawella, *Rawi 22034* (BAG, K).

134. *Arctium lappa* L. (Fig. 5-16)

(* , P, Vr, Fl, M, I, S, T): 11(1513).

This is a very rare species in Hawraman; there is a small population with few individuals in Biyara orchard growing in shady places near streams.

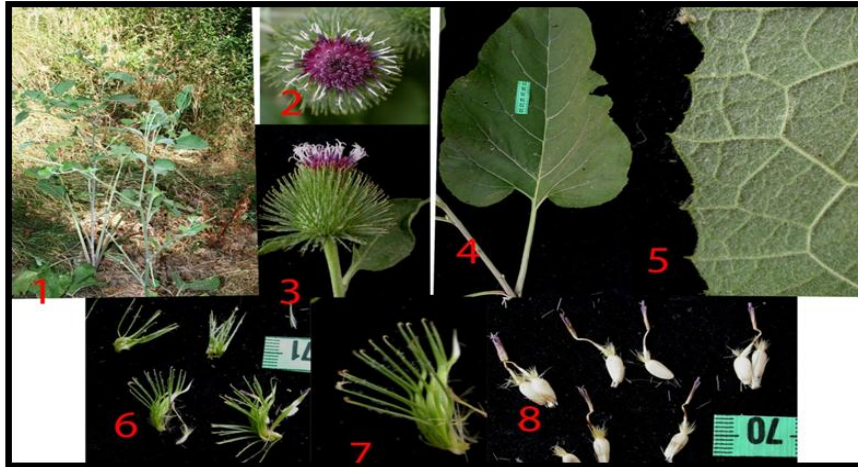


Figure 5-15: *Arctium lappa* L. 1. Habit. – 2 and 3. Heads. – 4. Leaf. – 5. Leaf margin. – 6 and 7. Involucral bract. – 8. Achenes

135. *Artemisia haussknechtii* Boiss. (Fig. 5-17)

(* , P, Vr, Fl, M, I, T): 12(719), 12(1107), 12(1329), 12(1485),
12(1548).



Figure 5-16: *Artemisia haussknechtii* Boiss. 1. Habit. – 2. Branch. – 3. Head and flowers

A very rare species in Hawraman and Kurdistan Iraq, where it grows in the subalpine region between cliffs.

136. *Aster subulatus* Michx.

(* , A, Vr, Fr, I, S, T): 12(1602).

137. *Bellis perennis* L.

(*, P, F, Fl, M, I, S, T): 11(15), 11(71), 12(173).

138. *Calendula palaestina* Boiss.

(*, A, Vr, Fl, Fr, I, S, T): 12(294).

139. *Calendula persica* C.A.Mey.

(*, A, O, Fl, M, I, T): 11(9), 11(285).

140. *Calendula tripterocarpa* Rupr.

(*, A, F, Fl, M, S): 11(420), 11(438), 12(130), 12(245).

141. *Carduus acicularis* Bert.

(*, A, O, Fl, Fr, M, I, T): 12(98).

142. *Carduus pycnocephalus* L.

(A, C, Fl, Fr, M, I, S, T): 11(297).

Other collections: near Tawella, *Rechinger 10236* (BUH, W).

143. *Carlina kurdica* Meusel & Kästner

(*, P, O, Fl, Fr, M, I, S, T): 11(1116), 11(1261), 12(1223),
12(1568).

144. *Carthamus dentatus* Vahl. (fig. 5-18)

(*, A, O, Fl, M, I, S, T): 12(1194).



Figure 5-17: *Carthamus dentatus* Vahl. 1. Habit. – 2. Head. – 3. Involucral bracts. – 4. Achenes

145. *Carthamus glaucus* M.Bieb.

(A, O, Fl, M, I, T): 11(1195), 12(1269).

Other collections: Hawraman, *Hausknecht s.n.* (JE).

146. *Carthamus oxyacanthus* M.Bieb.

(* , A, C, Fl, M, I, D): 11(1143), 12(713), 12(1276).

147. *Centaurea aggregata* Fisch. & C.A.Mey.

(P, F, Fl, M, I, T): 11(177), 11(1566), 12(1284).

Other collections: near Tawella, *Rechinger 10203* (BUH, W).

148. *Centaurea amadanensis* Sch.Bip.

(* , P, O, Fl, Fr, M, I, T): 11(765), 12(738), 12(930), 12(1090).

149. *Centaurea behen* L.

(P, F, Fl, M, I, T): 11(1235), 11(1499), 12(780), 12(936), 12(1376).

Other collections: near Tawella, *Rechinger 12357* (BUH, W).

150. *Centaurea iberica* Trev. ex Spreng.

(* , P, C, Fl, Fr, M, I, S, T): 11(1145), 12(902), 12(1176), 13(133).

151. *Centaurea imperialis* Hausskn. & Bornm.

(P, O, Fl, Fr, M, I, T): 11(1475), 12(1407).

152. *Centaurea koeieana* Bornm. (Fig. 5-19: 1)

(P, Vr, Fl, Fr, M, I, T): 11(825), 11(1119), 12(639).

Other collections: Tawella, *Rechinger 10293* (BUH, W).

153. *Centaurea persica* Boiss.

(P, O, Fl, Fr, M, I, T): 11(298), 12(752).

154. *Centaurea regia* Boiss. subsp. *cynocephala* (Wagenitz) Wagenitz.
(Fig. 5-19: 2)

(P, Vr, Fl, Fr, M, I): 12(485).

Other collections: Between Khurmall and Ali Beg, *Anders 1419* (no herbarium acronym cited in Wagenitz (1980).

155. *Centaurea solistitialis* L.

(* , P, C, Fl, Fr, M, I, T): 11(1146), 11(1343), 12(712).

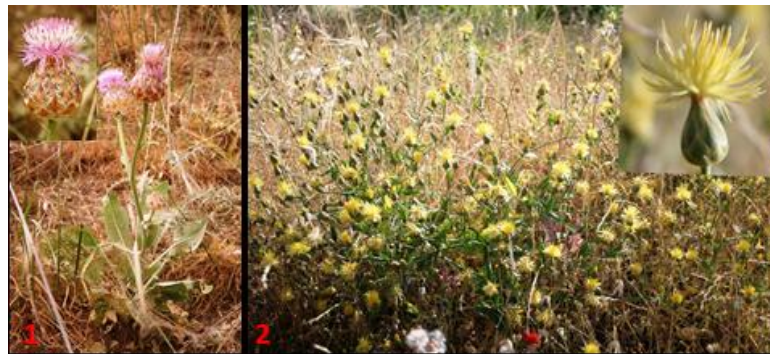


Figure 5-18: 1. *Centaurea koeieana* Bornm. – 2. *Centaurea regia* Boiss.

156. *Centaurea virgata* Lam.

(F, Fl, Fr, M, I, T): 11(1340), 12(606), 12(698),
12(885), 12(1000), 12(1280).

Other collections: near Tawella, *Rechinger 10203* (BUH, W).

Rechinger 10203 is a mixed collection of this species and *Centaurea aggregata*. The collection number was cited by Wagenitz (1980) under both species.

157. *Centaurea* sp.

(P, Vr, Fl and Fr): 12(371), 12(515).

158. *Cephalorrhynchus microcephalus* (DC.) Schchian

(P, O, Fl, Fr, M, I): 12(354), 12(400).

Other collections: near Tawella, *Rechinger 10285* (BUH, W); above Tawella, *Rechinger 10386* (BUH, W).

159. *Cephalorrhynchus rechingerianus* Tuisl

(P, Fl, Fr, I, T): 11(1035), 12(671).

Other collections: near Tawella, *Rechinger 10386-a* (BUH, W).

160. *Chardinia orientalis* (L.) Kuntze

(P, O, Fl, Fr, M, I, S, T): 11(1344), 11(1608), 12(1324),
12(1540), 13(58).

Other collection: near Tawella, *Rechinger 10320* (BUH, W).

161. *Cichorium intybus* L.

(* , A, C, Fl, M, I, S, T): 13(134)

162. *Cichorium pumilum* Jacq.

(A, F, Fl, M, I, S, T): 11(457).

Other collections: Susakan, *Rechinger 10143-b* (BUH, W).

163. *Cirsium conum* (L.) All.

(P, Vr, Fl, I, S, T): 12(1169), 13(135).

164. *Cirsium vulgare* (Savi) Ten. (Fig. 5:20)

(* , P, Vr, Fl, Fr, M, I, T): 12(1461), 12(1603).

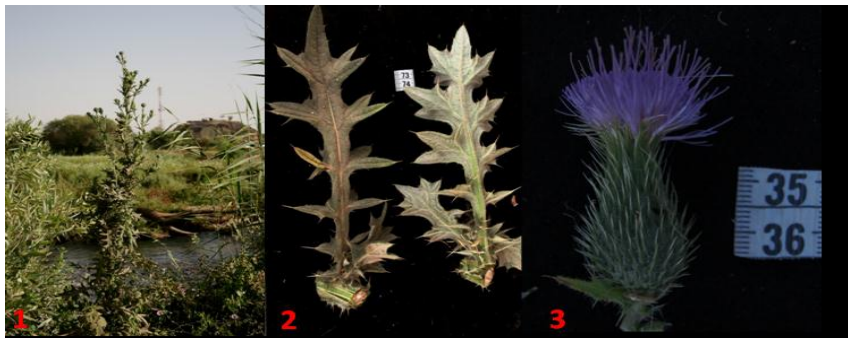


Figure 5-19: *Cirsium vulgare* (Savi) Ten. 1. Habit. – 2. Leaves. – 3. Head

165. *Cnicus benedictus* L.

(* , O, Fl, M, I, T): 11(896), 12(435), 12(898), 13(102).

166. *Conyza bonariensis* (L.) Cronquist

(* , A, Vr, Fl, Fr, T): 12(1213).

167. *Conyza canadensis* (L.) Cronquist

(* , A, C, Fl, Fr, M, I, S, T): 11(85), 11(349), 11(502), 11(584),

11(596), 12(259), 12(295), 12(600).

168 *Cousinia haussknechtii* C.Winkl.

Other collections: Hawraman and Shahu, *Hausknecht s.n.* (JE).

This gathering is the type collection of the species.

169. *Cousinia inflata* Boiss. & Hausskn.

(P, C, Fl, Fr, M): 11(1197), 11(1346), 11(1452), 11(1492), 11(1865), 12(534), 12(561), 12(652), 12(863), 12(878), 12(1139), 12(1239), 12(1310), 12(1368), 12(1407), 12(1495).

Other collections: near Tawella, *Rechinger 10215, 12358* (BUH, W), *Rawi 21947* (BAG, K); Kamarspa, between Halabja and Tawella, *Rawi 22179* (BAG, K); Hawara Barza, *Rawi 29507* (BAG, K); Molla Khort, *Rawi 29467* (BAG, K).

This species is endemic to Hawraman of Kurdistan Iraq. It has not yet been collected from across the border in Iran.

170. *Cousinia leptolepis* Rech.f. (fig. 5-21)

(P, R, Fl, M, I): 12(1128), 12(1492).

Other collections: Hawraman, *Rawi 19784* (BAG, K).



Figure 5-20: *Cousinia leptolepis* Rech.f. 1. Habit. – 2. Cauline leaves. – 3. Basal leaves Lower. – 4. Heads. – 5. Basal involucre bracts

171. *Cousinia pergamacea* Boiss. & Hausskn.

(* , P, Vr, Fl, M, I): 12(756), 12(1265), 12(1369), 12(1502).

172. *Crepis alpina* L.

(* , A, C, Fl, Fr, M, I, T): 11(306), 11(880), 11(946), 12(19),
12(33), 12(527), 12(607), 12(846), 12(891), 12(1045).

173. *Crepis foetida* L. subsp. *commutata* (Spreng.) Babcock

Other collections: Susakan, *Rechinger 10177* (BUH, W).

174. *Crepis kotschyana* (Boiss.) Boiss.

Other collections; Susakan, *Rechinger 10179* (BUH, W).

175. *Crepis micrantha* Czerep.

(* , A, O, Fl, M): 12(195), 12(292).

176. *Crepis pulchra* L. subsp. *turkestanica* Babcock

(A, F, Fl, M, T): 11(947), 11(1059), 12(783), 12(1043).

Other collections: near Tawella, *Rechinger 10237* (BUH, W).

177. *Crepis sancta* L.

(* , F, Fl, M, I, T): 12(459).

178. *Crupina crupinastrum* (Moris) Vis.

(A, F, Fl, M, I, S, T): 11(15), 11(230), 11(253), 11(1850), 13(8).

Other collections: near Susakan, *Rechinger 10141* (BUH, W).

179. *Cymbolaena griffithii* (A.Gray) Wagenitz

Other collections: near Tawella, *Rechinger 10273* (BUH, W).

180. *Echinops candelabrum* Rech.f.

(* , P, Vr, Fl, M, I, T): 11(1558), 11(1625).

181. *Echinops chardinii* Boiss. & Buhse

(* , P, C, Fl, Fr, M, D): 11(832), 11(1004), 12(499),
12(1273), 12(1298).

182. *Echinops inermis* Boiss. & Hausskn.

(P, O, Fl, M, I, T): 11(864), 11(1233), 11(1447), 12(656).

Other collections: Hawraman, *Haussknecht s.n.* (JE).

183. *Echinops orientalis* Trautv.

(* , P, C, Fl, M, I, S, T): 11(929), 11(1121), 11(1191),
11(1446), 12(1229), 12(1235), 12(1243), 12(1408).

184. *Echinops parviflorus* Boiss. & Buhse

(* , P, Vr, Fl, M, I): 11(1198).

185. *Echinops viscosus* DC.

(* , P, R, Fl, M): 12(1178), 12(1187).

186. *Echinops* sp.

(* , P, Vr, Fl, M, I): 12(1241).

187. *Eclipta alba* (L.) Hassk.

(* , P, Vr, Fl, Fr, I, S, T): 12(1599)

188. *Filago eriocephala* Guss. (Fig. 5-22)

(**, P, Vr, Fl, I, S, T): 12(1065), 13(117).

Figure 5-21: *Filago eriocephala* Guss. 1. Habit. – 2. Part of plant. – 3. Head

Description: Plants densely grayish white, lanate. Stem (5–)10–20(–35) cm, erect or sometimes procumbent, usually branched above middle. Leaves 8–24 × 2–5(–8) mm. Heads ca. 4 × 2 mm, upper protruding from lanate indumentum, in very dense, subglobose, ovoid or oblong clusters of (20–)30–50(–60) heads, 9–17 × 10–12 mm, paleae ca. 3 × 1 mm, broadly lanceolate, stramineous, distinctly keeled at apex, shortly aristate, arista ca. 0.5 mm. Inner female flowers 10–20, ca. 2·5 mm; hermaphrodite flowers 2–4, ca. 2·2 mm.

Habitat: sandy soil, eroded places, roadsides.

Distribution: A very rare species in Kurdistan, where it grows in a restricted area at 1230m. elevation and small populations of not more than 50 plants.

189. *Filago palaestina* (Boiss.) Chrtek & Holub.

(A, F, Fl, M, I, S): 11(791), 11(876), 12(255), 12(594).

190. *Filago pyramidata* L.

(*, A, O, Fl, M, I, T): 11(422), 11(437), 12(225).

191. *Filago* sp.

(A, R, Fl): 11(278).

192. *Garhadiolus angulosus* Jaub. & Spach

(A, O, Fr, M, I): 12(576).

Other collections: near Tawella, *Rechinger 12380* (BUH, W).

193. *Gundelia tournefortii* L.

(P, C, Fl, M, I, S, T): 11(208).

194. *Hedypnois rhagadioloides* subsp. *cretica* (L.) Hayek

(* , A, O, Fl, Fr, M, I, T): 11(452), 11(750), 12(131), 12(819).

195. *Hedypnois rhagadioloides* (L.) F.W.Schmidt subsp. *rhadadioloides*

(* , A, Fl, Fr, M, I, T): 11(639), 12(244).

196. *Helichrysum armenium* DC.

(* , P, F, Fl, Fr, M, I, S, T): 12(716), 12(1514).

197. *Helichrysum pseudoplicatum* Náb.

(P, Fl, Fr, M, I, T): 11(1471), 11(1565), 12(864),

12(1095), 12(1121), 12(1303), 12(1392).

Other collections: near Tawella, *Rechinger 10342* (BUH, W).

198. *Iranecio paucilobus* (DC.) B.Nord. (fig. 5-23)

(* , P, Vr, Fl, I): 12(1487).



Figure 5-22: *Iranecio paucilobus* (DC.) B.Nord. 1. Habit. – 2. Basal leaves. – 3. Bract. – 4. Heads. – 5. Flowers

199. *Jurinea macrocephala* DC. (Fig 5-24)

(* , P, R, Fl, Fr, M, I, T): 11(1607), 12(1586), 12(1345).



Figure 5-23: *Jurinea macrocephala* DC. 1. Plant – 2. Part of plant. – 3. Heads. – 4. Flowers

200. *Lactuca aculeata* Boiss. & Kotschy ex Boiss. (5-25)

(* , P, O, Fl, M, I, T): 12(1575).

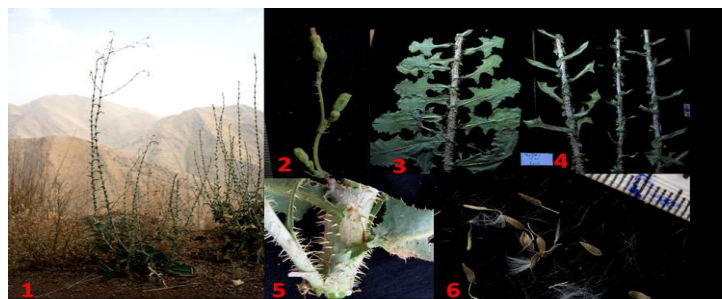


Figure 5-24: *Lactuca aculeata* Boiss. & Kotschy ex Boiss. 1. Habit. – 2. Head. – 3. Lower cauline leaves. – 4. Upper cauline leaves. – 5. Hispid stems. – 6. Achenes

201. *Lactuca saligna* L.

(* , A, O, Fl, Fr, M, I, T): 12(1002), 12(1402), 12(1403).

202. *Lactuca scarioloides* Boiss.

(P, O, Fl, Fr, M, I, S, T): 12(954), 12(1082), 12(1509).

Other collections: Hawraman, *Rawi s.n.* (BAG, K).

203. *Lactuca serriola* L.

(A, C, Fl, Fr, M, I, S, T): 11(1122), 12(1042), 12(1411), 12(1413),
12(1439), 12(1574).

204. *Lactuca undulata* Ledeb.

(* , P, O, Fl, M, I, S T): 11(706), 12(1032).

205. *Lapsana grandiflora* M.Bieb.

Other collections: near Tawella *Rechinger 12402* (BUH, W).

206. *Matricaria aurea* (Loefl.) Schultz-Bip.

(* , A, R, Fl, M, I, S, T): 12(1320).

207. *Matricaria recutita* L.

(* , A, C, Fl, M, I, S, T): 11(211), 11(439), 11(647), 11(700),
12(18), 12(226).

208. *Notobasis syriaca* (L.) Cass.

(A, C, Fl, M, I, S, T): 11(234), 11(252), 11(751), 12(252).

209. *Onopordon carduchorum* Bornm. & Beauv.

(P, Fl, Fr, M, I, S, T): 11(768), 12(442), 12(476), 12(559).

Other collections: near Tawella, *Rechinger 12353* (BUH, W).

210. *Pallenis spinosa* (L.) Cass.

(* , P, V, Fl, M, I, T): 12(1162).

211. *Pentanema flexuosum* (Boiss. & Hausskn.) Rech.f.

Other collections: Hawraman, *Haussknecht s.n.* (JE).

212. *Phagnalon rupestre* (L.) DC.

(* , P, O, Fl, M, I, T): 11(1113), 12(153).

213. *Picnomon acarna* (L.) Cass.

(* , A, F, Fl, M, I, S, T): 12(1462).

214. *Picris babylonica* Hand.-Mazz.

(* , A, R, Fl): 11(242).

215. *Picris longirostris* Schultz-Bip.

(* , A, F, Fl, M, I, T): 12(85), 12(104).

216. *Picris strigosa* M.Bieb. subsp. *kurdica* Lack

Other collections: near Tawella, *Rechinger 10281* (BUH, W).

217. *Picris strigosa* subsp. *macrotricha* Lack

(P, C, Fl, Fr, I, T): 11(1115), 11(1194), 11(1334),

11(1572), 12(1255), 12(1274).

Other collections: near Tawella, *Rechinger 10281-b* (BUH, W).

218. *Postia puberula* Boiss. & Hausskn.

(* , P, Vr, Fl, Fr, M, I): 11(1114), 12(835).

219. *Psychrogeton amorphoglossus* (Boiss.) Novopokr.

(P, Vr, Fl, M, I, T): 12(1335), 12(1506).

220. *Pulicaria dysenterica* (L) Bernh.

(* , P, O, Fl, M, I, T): 12(208), 12(1456), 12(1614).

221. *Pulicaria gnaphalodes* (Vent.) Boiss.

(* , P, Vr, V, M, I): 11(1262), 12(1566).

222. *Rhagadiolus edulis* (L.) Gaertn.

(* , A, Vr, Fl, M, I): 11(201).

223. *Rhagadiolus stellatus* (L.) Gaertn.

(* , A, O, Fl, Fr, M, I): 11(745), 12(302), 12(576).

224. *Scariola orientalis* (Boiss.) Soják

(* , P, Fl, Fr, M): 11(1458), 11(1547), 12(1432).

225. *Scolymus maculatus* L.

(* , A, Fl, Fr, M, I): 11(1152), 12(1179).

226. *Scorzonera bulbipes* Boiss. & Hausskn.

(* , P, Fl, Fr, M, I, T): 11(37), 11(505), 11(578), 12(332).

227. *Scorzonera cinerea* Boiss.

Other collections: Hawraman, Rawi et al. 19742(BAG, K)

228. *Scrozonera davissi* Lipsch.

(* , O, Vr, Fl, Fr, M, I, T): 12(798).

229. *Scorzonera lanata* (L.) O.Hoffm.

(* , P, R, Fl, M, I, T): 11(619).

230. *Scrozonera papposa* DC.

(* , P, Vr, Fr, I, T): 12(482).

231. *Scrozonera phaeopappa* (Boiss.) Boiss.

(P, R, Fl, Fr, M, I, T): 11(93), 11(183), 11(617).

Other collections: near Tawella, *Rechinger 12424* (BUH, W).

232. *Scorzonera* sp.

(P, O, Fl, Fr, M): 11(1467), 12(974), 12(1141), 12(1334).

233. *Senecio doriiformis* DC. subsp. *orientalis* (Fenzl) Matthews

(A, Vr, Fl, I, T): 12(287).

Other collections: Hawraman and Shahu, *Hausknecht s.n.* (JE).

It is uncertain whether or not Hausknecht's collection was made from Iran or across the border. If it turns out to be from Iran, then our collection is the first for Hawraman, though the species was collected twice before from Pira Magrun.

234. *Senecio glaucus* L.

(A, C, Fl, M, I, T): 11(2), 11(934), 12(107), 12(550), 12(860).

Other collections: near Tawella, *Rechinger 12477* (BUH, W), *Rawi 22117* (BAG, K); N of Biyara, *Gillett 11761* (BAG, K); Halabja *Rechinger 10127* (BUH, W), *Rawi 21862* (BAG, K).

235. *Serratula haussknechtii* Boiss.

Other collections: Hawraman and Shahu, *Haussknecht s.n.* (JE).

It is uncertain if the above record is from our Hawraman, though several collections are known from Kurdistan Iran but not Iraq.

236. *Silybum marianum* (L.) Gaertn.

(* , A, C, Fl, M, I, S, T): 11(295), 12(204).

237. *Sonchus asper* (L.) Hill

(* , A, C, Fl, Fr, M, I): 11(53), 11(273), 11(475), 11(1273), 11(1519).

238. *Steptorhamphus tuberosus* (Jacq.) Grossh.

(P, O, Fl, Fr, M, I, S, T): 11(509), 11(793), 12(688), 12(802), 12(1410).

Other collections: near Tawella, *Rechinger 10263* (BUH, W), *Rawi 22333* (BAG, K); between Halabja and Tawella, *Rawi 22037* (BAG, K).

239. *Tanacetum polycephalum* Schultz Bip. subsp. *heterophyllum* (Boiss.) Podl.

Other collections: Hawraman, *Rawi et al. 19732* (BAG, K).

240. *Tanacetum polycephalum* Schultz Bip. subsp. *polycephalum*

Other collections: N of Biyara, *Gillett 11794* (BAG, K); near Tawella, *Rawi 22209* (BAG, K), *Rechinger 10375* (BUH, W); Zalm, *Rawi et al. 29380* (BAG, K).

241. *Taraxacum calocephalum* Hand.-Mazz. (Fig. 5-26: 1).

(* , P, O, Fl, Fr, M, I, T): 12(180).

242. *Taraxacum juzepczukii* Schischk.

(* , P, O, Fl, I, T): 12(1406), 12(1585).

243. *Taraxacum montanum* (C.A.Mey.) DC.

(* , P, O, Fl, Fr, M, I, T): 11(1582), 11(1594), 12(1236).

244. *Tragopogon bornmuelleri* M.Ownbey & Rech.f. (Fig. 5-26: 2).

(P, Vr, Fl, I): 12(746), 13(113).

Other collections: near Tawella, *Rechinger 10357* (BUH, W).

245. *Tragopogon buphthalmoides* (DC.) Boiss.

(P, O, Fl, Fr, M, I): 11(1578), 12(411), 12(599).



Figure 5-25: 1. *Taraxacum calocephalum* Hand.-Mazz. 2. *Tragopogon bornmuelleri* M. Ownbey & Rech.f.

246. *Tragopogon longirostris* Bisch.

(P, F, Fl, Fr, M, I, S, T): 11(91)S, 11(200), 11(232).

11(353), 11(609), 11(622).

Other collections: Susakan, *Rechinger 10160* (BUH, W); near Tawella, *Rechinger 10267* (BUH, W).

247. *Tragopogon reticulatus* Boiss. & Huet.

(P, Fl, Fr, M, I): 12(411), 12(599).

Other collections: near Tawella, *Rechinger 10357* (BUH, W).

248. *Urospermum picroides* (L.) Desf.

Other collections: near Tawella, *Rechinger 12438* (BUH, W).

249. *Xanthium strumarium* L.

(* , P, C, Fr, M, I, S, T): 12(1615).

250. *Xeranthemum squarrosum* Boiss.

(P, C, Fl, M, I, S, T): 11(790), 11(1345), 12(900).

Other collections: Susakan, *Rechinger 10162* (BUH, W).

251. *Zoegea erinita* Boiss.

Other collections: near Tawella, *Rechinger 12443, 12444* (BUH, W).

252. *Zoegea leptaura* L. subsp. *mesopotamica* (Czerep.) Rech.f.

(A, F, Fl, M, I, S, T): 11(775), 11(1182), 12(710), 12(1322), 13(122).

Other collections: between Khurmall and Halabja, *Hadač 5085* (BUH, PR).

16. Family BERBERIDACEAE

This family is represented in Hawraman by one genus and one species.

253. *Bongardia chrysogonum* (L.) Spach

(P, C, Fl, M, I, T): 11(131), 11(522), 11(541).

Other collections: Kamarspa, *Rawi* 22218 (BAG, K); near Tawella, *Rechinger* 12405 (BUH, W).

17. Family BIEBERSTEINIACEAE

This family is represented in Hawraman by one genus and one species.

254. *Biebersteinia multifida* DC. (Fig. 5-27)

(P, F, Fl, Fr, M, I, S, T): 11(127), 11(620), 11(965), 11(1029), 12(385).

Other collections: Tawella, *Rechinger*, 10354 (BUH, W).



Figure 5-26: *Biebersteinia multifida* DC. 1. Habit. – 2. Roots. – 3. Flowers. – 4. Fruits. – 5. Seeds

18. Family BORAGINACEAE

This family is represented in Hawraman by 13 genera and 40 taxa, of which eight are new to Hawraman and one is new to Iraq.

255. *Alkanna bracteosa* Boiss.

(P, F, Fl, Fr, I): 11(1044), 12(1581).

Other collections: Tawella, *Rechinger 10326* (BUH, W); Molla Khort, *Rawi 29571* (BAG, K).

256. *Alkanna frigida* Boiss.

Other collections: Hawraman, *Hausknecht s.n.* (JE).

557. *Alkanna orientalis* Boiss.

(**, P, F, Fl, M, I, S, T): 11(578), 12(681), 12(727).

Description: Plants with thick, several-branched caudex, with short trichomes and longer ones tuberculate at base. Stems 20–40 cm long, branched. Leaves 3–6 × 0.6–1.5 cm, lanceolate, acute to subobtuse, short petiolate. Cymes dense, elongated later; bracts shorter than cauline leaves, subamplexicaul; pedicels obsolete. Calyx 6–7 mm in flower, becoming accrescent in fruit, teeth lanceolate, free to almost base; corolla yellow, glabrous, horse-shoe shaped, ca. 12 mm long. Nutlets 3–4 mm wide, horizontal, areola short stalked, densely reticulate-rugose.

This is the first record for the species from Iraq, a Kurdistan endemic that grows in NW Iran and adjacent Turkey.

258. *Anchusa italica* Retz.

(P, C, Fl, Fr, M, I, S, T): 12(14), 12(48), 12(896), 12(959), 12(1414).

Other collections: Susakan, *Rechinger 10174* (BUH, W).

Three varieties have been recognized by Riedl (1967), all occurring in Kurdistan Iraq but based on minor differences in trichome density and thickness. The type of var. *kurdica* Guşuleac was collected by Bornmüller from Kirkuk, and it is likely that it represents an interspecific hybrid between *Anchusa italica* and *A. strigosa* Labill. Only var. *italica* grows in Hawraman.

259. *Asperugo procumbens* L.

(P, F, Fr, M, I, S, T): 11(1020).

Other collections: Kamarspa, *Rawi* 22268 (BAG, K).

260. *Buglossoides arvensis* (L.) I.M.Johnst.

(A, F, Fr, M, I, T): 11(369), 12(127), 12(608), 12(966).

Other collections: Halabja, *Rawi* 8827 (BAG, K).

This and the following species were treated in *Flora Iranica* (Riedl, 1967) as species of *Lithospermum* L. However, this genus differs from *Buglossoides* Moench by having yellow or orange (vs. blue or white) flowers and corolla throat with (vs. without) faucal appendages or groups of stipitate hairs that do not form (vs. strongly form) elongated bands to the anthers.

261. *Buglossoides incrassata* (Guss.) I.M.Jonst.

(* , A, R, Fl, Fr, M, I, S, T): 12(277).

262. *Buglossoides tenuiflora* (L.f.) I.M.Johnst.

(* , A, F, Fr, M, I, T): 11(581), 11(955), 12(701).

263. *Cynoglossum creticum* Mill. (Fig. 5-28)

(P, F, Fl, Fr, M, I, S, T): 11(139), 11(623), 11(611), 11(1288),
11(1528), 12(557).



Figure 5-27: *Cynoglossum creticum* Mill. 1. Habit. – 2. Inflorescence. – 3. Cyme

Other collections: Tawella, *Rechinger 10233* (BUH, W).

264. *Echium italicum* L. var. *biebersteinii* Lac.

Other collections: Tawella, Kani Spi, *Rechinger 10387* (BUH, W).

This variety differs from var. *italicum* by having broadly pyramidal (vs. cylindrical to narrowly pyramidal) inflorescence with lower branches 12–20 (vs. to 10) cm long.

265. *Echium italicum* L. var. *italicaum*

(P, F, Fl, M, I, S, T): 11(1361), 12(883).

Other collections: Khurmall, *Rawi 8941* (BAG, K).

266. *Heliotropium lasiocarpum* Fisch. & C.A.Mey.

(* , A, F, Fl, Fr, M, I, T): 11(1169), 11(1451), 12(826), 12(911),
12(959).

267. *Heliotropium noeanum* Boiss.

(A, F, Fl, Fr, M, I, S, T): 11(1109), 12(1238), 12(1278), 12(1626).

Other collections: Tawella, *Rechinger 12396* (BUH, W); Halabja, *Rechinger 10128* (BUH, W).

268. *Heliotropium* sp.

(A, F, Fl, M): 12(1109), 12(1238), 12(1278).

269. *Myosotis ramosissima* Rochel ex Schultes.

(* , A, R, Fl, M, I, T): 11(26), 12(164).

270. *Nonea ventricosa* (Sm.) Griseb.

(** , Vr, Fl, Fr, S, T): 11(653).

Plants annual, somewhat setose-hispid throughout. Stems 23–35 cm tall, several from base. Basal leaves withered by anthesis; middle cauline leaves, lanceolate, 1.5–4.5 × 3–9 mm, entire, sessile, semiamplexicaul at base. Inflorescence scorpioid, lax, elongated in fruit; fruiting pedicels divaricate, 1.5–4 mm. Calyx 4–5 mm, divided to 1/3 length, lobes acute; fruiting calyx 8–11 mm, strongly enlarged and becoming globose in fruit. Corolla white, subfunnelform, 5–6 mm, teeth 2–3 mm, scales long hairy, inserted at or slightly below middle; annulus hairs; anthers ca. 1 mm. Nutlets transversely reniform, 1–1.5 × 2–3 mm, blackish, with vertical ridges, minutely puberulent, ventral scar without a ring.

This is the first record of the species from Iraq. *Nonea ventricosa* is easily distinguished from all other species of the genus that grow in southwestern Asia by a combination of white flowers and black, reniform nutlets without a ring around the ventral scar. All other species of the genus in Iraq have purple flowers.

271. *Onosma bulbotrichum* DC.

(P, F, Fl, M, I, T): 12(103), 12(303), 12(389), 12(480).

Other collections: Susakan, *Rechinger 10132* (BUH, W).

272. *Onosma cardiostegium* Bornm.

(P, Vr, Fl, M, I): 12(495).

Other collections: Tawella, *Rechinger 10370* (BUH, W).

Endemic to Kurdistan Iraq and Iran.

273. *Onosma haussknechtii* Bornm.

(* , P, F, Fl, Fr, M, I, T): 11(388), 11(439), 11(852), 11(1008),
11(1041), 12(502), 12(779).12(625).

Endemic to Kurdistan Iraq and Iran.

274. *Onosma hawramanensis* S.A.Ahmad, sp. nov. TYPE: Iraq, Kurdistan, Sulaimani Province, Rangin Mt., subalpine rocky grassland, 2004 m, 35°21'20"N, 46°05'10"E, 8 June 2012, *Saman A. Ahmad 12-997* (holotype, SUFA). (Fig. 5:28)

(***, P, Vr, Fl, Fr): 12(997).

Herbs perennial, canescent, woody at base. Stems 20–30 cm, several branched at base, few branched distally, hispid, with spreading white trichomes 1–2 mm, dark brown after bark peeling off. Basal and lowermost cauline leaves soon withered; middle leaves broadly elliptic, 3–4 × 1.5–2 cm, sessile, base cuneate, margin entire, apex subacute, densely pubescent with ascending trichomes to 2 mm and with sparsely pubescent tuberculate base with simple trichomes; uppermost leaves elliptic-oblongate, smaller. Inflorescences dense, scorpioid, 5–10-flowered; bracts lanceolate, 10–20 × 2–5 mm; flowering pedicels 1–2 mm, slightly elongated and 3–4 mm in fruit. Calyx ca. 10 mm in flower, 12–15 mm in fruit, not accrescent, united at base, densely white pubescent with trichomes to 2 mm; corolla yellow, tubular, 13–15 mm, slightly expanded at apex, pubescent outside, glabrous inside; teeth broadly triangular, ca. 1.5 × 1.5 mm; nectar annulus poorly developed, sparsely pubescent; filaments ca. 4 mm, inserted at middle of corolla tube, not expanded at base; anthers free, linear, 6–7 mm, sagittate at base, sterile apex bidentate, to 1.5 mm. Fruits 5–5.5 × 3.5–4 mm, broadly

ovoid, glossy, slightly reticulate, straight, glabrous, carinate adaxially, slightly socarinate abaxially, apex straight, flattened.

Onosma hawramanensis is known only from the type gathering from Rangin Mt which has never been explored botanically before. It is easily distinguished from the remaining congeners in Iraq and neighboring countries by a combination of perennial habit; broadly elliptic cauline leaves with the setose trichomes tubercles sparsely pubescent with simple trichomes, basally united calyx not accrescent in fruit; yellow corolla pubescent outside and glabrous inside, with broadly triangular lobes, and sparsely pubescent nectar annulus; filaments inserted at middle of corolla tube, linear anthers free at base and bidentate at apex; and broadly ovoid, glabrous and glossy fruits $5-5.5 \times 3.5-4$ mm, with slightly reticulate surface.



Figure 5-28: *Onosma hawramanensis* S.A.Ahmad. 1. Habit – 2. Flowers.

275. *Onosma latifolium* Boiss. & Hausskn.

(P, F, Fl, Fr, M, I, S, T): 11(131), (191), 11(387), 11(566),
12(308), 12(358), 12(512).

Other collections: Molla Khort, *Rawi* 29572 (BAG, K); Susakan, *Rechinger* 10181 (BUH, W); Tawella, *Rechinger* 10382 (BUH, W).

276. *Onosma macrophyllum* Bornm. var. *angustifolium* Bornm.

(* , P, O, Fl, Fr, M, I): 11(824), 11(1023), 12(1580), 12(326).

Endemic to Kurdistan Iraq and Iran. Two varieties were recognized by Riedl (1967) based on leaf width. In var. *angustifolium* Bornm. (known only from Dokan), the leaves are up to 2.5 cm wide, whereas in var. *macrophyllum* (not reported for Iraq) they are to 5 cm wide.

277. *Onosma microcarpum* Bunge

Other collections: Hawraman near Iran-Iraq borders, *Rechinger 10333* (BUH, W); Tawella, *Rechinger 10133* (BUH, W).

278. *Onosma rascheyanum* Boiss.

Other collections: Tawella, *Rechinger 12415* (BUH, W).

279. *Onosma rostellatum* Lehm.

(* , P, F, Fl, M, I, T): 11(246), 12(841), 12(1134).

280. *Onosma sericeum* Willd. (Fig. 5-30)

(P, F, Fl, Fr, M, I, S, T): 11(131), 11(199), 11(387), 11(566),

11(730), 11(755), 11(1123), 11(1228), 12(1564), 12(308),

12(358), 12(512)12(893), 12(1453), 13(46).

Other collections: Hawara Barza Mt., *Rawi et al. 29529* (BAG, K); Susakan, *Rechinger 10189, 10280* (BUH, W).



Figure 5-29: *Onosma sericeum* Willd. 1. Habit. 2 and 3. Cymes

281. *Onosma* sp.

(P, O, Fl): 11(1008), 12(779), 12(997).

282. *Phyllocara aucheri* (DC.) Guşuleac

(A, F, Fl, Fr, M, I, S, T): 11(51), 11(1071), 11(1631), 12(674),

Other collections: Susakan, *Rechinger 10193* (BUH, W).

283. *Rindera lanata* (Lam.) Bunge (Fig. 5-31)

(P, O, Fl, Fr, M, I, T): 11(614), 1005), 12(382), 12(693).



Figure 5-30: *Rindera lanata* (Lam.) Bunge. 1. Habit. – 2. Leaves. – 3. Inflorescence. – 4. Fruits

Other collections: Hawraman, *Gillett 11824* (BAG, K).

284. *Rochelia persica* Bunge ex Boiss.

(A, O, Fr, M, I, T): 11(498), 11(722), 11(877), 12(430).

Other collections: above Tawella, *Rechinger 10377* (BUH, W).

285. *Solananthus circinnatus* Ledeb.

Other collections: Hawraman, *Gillett 11867* (BAG, K); Tawella, *Rechinger 10373* (BUH, W).

286. *Solenanthus stamineus* (Desf.) Wettst.

Other collections: Hawraman, *Hausknecht s.n.* (JE).

287. *Trichodesma incanum* (Bunge) A.DC.

(* , P, O, Fl, Fr, M, I, T): 11(1214), 12(1311).

19. Family BRASSICACEAE (CRUCIFERAE)

This family is represented in Hawraman by 28 genera and 63 species, of which 23 are new to Hawraman.

288. *Aethionema carneum* (Banks & Sol.) B.Fedtsch. (Fig. 5-32: 1)

(A, O, Fl, Fr, M, I, S, T): 11(560), 11(1047), 12(169).

Other collections: 10 km W of Tawella to Halabja, *Rawi 22120* (BAG, K).

289. *Aethionema fimbriatum* Boiss. (Fig. 5-32: 2)

(P, R, Fl, Fr, M, T): 11(1603), 12(1072).

Other collections: above Darimarr, *Gillett 11880* (BAG, K).

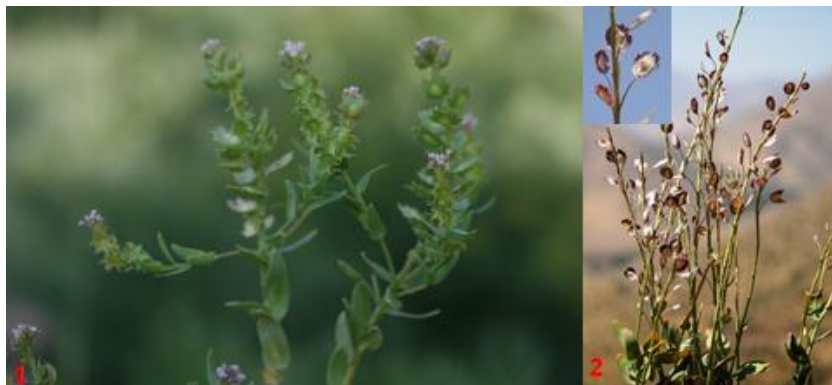


Figure 5-31: 1. *Aethionema carneum* (Banks and Sol.) B. Fedtsch. ; 2. *Aethionema fimbriatum* Boiss.

290. *Alliaria petiolata* (M.Bieb.) Cavara & Grande

(A, F, Fl, Fr, M, I, S, T): 11(22), 11(178), 11(571), 12(299).

Other collections: Susakan, near Tawella, *Rechinger 10154* (BUH, W).

291. *Alyssum asperum* (Grauer) Al-Shehbaz

(A, R, Fl, Fr, M, I, S, T): 11(378).

Other collections: Hawraman, near Tawella, *Rechinger 12378* (BUH, W).

292. *Alyssum contemptum* Schott & Kotschy

Other collections: N of Halabja, *Rawi 2205a* (BAG, K); Dara Tri, between Halabja and Tawella, *Rawi 21996* (BAG, K); Tawella, *Rechinger 12363* (BUH, W); Kamarspa, *Rawi 22206* (BAG, K).

293. *Alyssum jonthlaspi* (L.) Clairv.

(* , A, F, Fl, Fr, M, I, S, T): 11(14), 11(381), 11(815), 12(7), 12(290).

294. *Alyssum lappaceum* (Boiss.) Al-Shehbaz

(* , A, R, Fl, Fr, M, I, T): 11(378).

295. *Alyssum murale* Waldst. & Kit.

(P, R, Fl, M, I, S, T): 12(626).

Other collections: near Tawella, *Rechinger 10337* (BUH, W).

296. *Alyssum penjwinense* Dudley

This species is endemic to Kurdistan Iraq and Iran.

Other collections: N of Halabja, *Rawi 22083* (BAG, K).

297. *Alyssum stapfii* Vierh.

(A, C, Fl, M, I, S, T): 11(900), 11(12), 12(9), 12(1056), 13(3).

Other collections: Hawraman, N of Halabja, *Rawi* 22057 (BAG, K); near Tawella, *Rechinger* 10304 (BUH, E, K, W).

298. *Alyssum strictum* Willd.

(A, F, Fr, M, I, S, T): 11(590), 12(679), 12(1054), 13(22).

Other collections: Hawara Barza, *Rawi et al.* 29518 (BAG, K).

299. *Alyssum strigosum* Banks & Sol.

(A, F, Fr, M, I, S, T): 11(292), 12(222), 12(298).

Other collections: 8 km N of Kani Spi, *Rawi* 22394 (BAG, K); 10 km W of Tawella, *Rawi* 22126 (BAG, K); Tawella, *Rawi* 21971 (BAG, K), *Rechinger* 10192 (BUH, W).

300. *Alyssum szovitsianum* Fisch. & C.A.Mey.

(* , A, F, Fl, M, I, S, T): 12(330), 12(341), 12(428), 12(654), 12(999).

301. *Arabis aucheri* Boiss.

(* , A, O, Fl, Fr, M, I, S): 11(365), 11(886).

302. *Arabis auriculata* Lam.

(A, F, Fl, M, I, S, T): 11(125), 11(984)

Other collections: Tawella, *Rechinger* 12354 (BUH, W).

303. *Arabis caucasica* Willd.

(P, F, Fl, Fr, M, I, S, T): 11(126), 11(600), 12(790).

Other collections: N of Biyara, *Gillett 11815* (BAG, K).

304. *Aubrieta parviflora* Boiss.

(P, F, Fl, Fr, M, I, S, T): 11(258), 12(357).

Other collections: Darimarr, *Gillett 11832* (BAG, K); Kamarspa, *Rawi 22248* (BAG, K); Tawella, *Rawi 21911* (BAG, K), *Rechinger 10254, 15812* (BUH, W).

305. *Barbarea minor* C.Koch

Other collections: Hawraman, *Hausknecht s.n.* (JE).

306. *Barbarea plantaginea* DC.

(P, Vr, Fl, M, I): 12(961).

Other collections: above Darimarr, *Gillett 11861* (BAG, K).

307. *Biscutella didyma* L.

(* , A, F, Fl, M, I, S, T): 11(255), 11(302), 12(235), 12(299).

308. *Brassica nigra* (L.) W.D.J.Koch

(* , A, F, Fl, Fr, M, I, S, T): 11(674), 11(1170), 11(652),

12(234), 12(464), 12(918).

309. *Brassica rapa* L.

(* , A, F, Fr, M, I, S, T): 11(30), 11(307), 12(60).

310. *Brossardia papyracea* Boiss. (Fig. 5-33)

(P, F, Fr, M, I, S, T): 11(585), 12(677).

Other collections: N of Halabja, *Rawi 22105* (BAG, K); above Darimarr, *Gillett 11851* (BAG, K); Kamarspa, *Rawi 22171* (BAG, K); near Tawella, *Rechinger 10350* (BUH, W).



Figure 5-32: *Brossardia papyracea* Boiss. 1. Habit. – 2. Flowers. – 3. Fruit

311. *Calepina irregularis* (Asso) Thell.

(* , A, O, Fl, Fr, M, I, S, T): 11(29), 12(51).

312. *Capsella bursa-pastoris* (L.) Medik.

(* , A, F, Fl, Fr, M, I, S, T): 11(57).

313. *Cardamine hirsuta* L.

(* , A, F, Fl, M, I, T): 11(17), 11(115), 12(189).

314. *Crambe orientalis* L.

(* , P, F, Fl, Fr, M, I, S, T): 11(1011), 11(1626), 12(692).

315. *Erysimum alpestre* Kotschy ex Boiss.

Other collections: Hawraman, *Hausknecht s.n.* (JE).

316. *Erysimum boissieri* Polatschek

(B, F, Fl, Fr, M, I): 11(136), 11(144), 11(242), 11(589), 11(865), 11(892), 11(971), 12(1005).

Other collections: Hawraman, *Hausknecht s.n.* (JE).

317. *Erysimum eginense* Hausskn. & Bornm.

(B, R, Fr, M, I, T): 11(589), 12(1005).

Other collections: N Halabja, *Rawi 22063* (BAG, K); near Tawella, *Rechinger 10315* (BUH, E, W), *Rechinger 10378* (BUH, W); Kamarspa, *Rawi 22254* (BAG, K); Hawara Barza, *Rawi et al. 29515* (BAG, K).

318. *Erysimum gladiiferum* Boiss. & Hausskn.

Other collections: Hawraman, *Hausknecht s.n.* (JE).

319. *Erysimum kurdicum* Boiss. & Hausskn.

(P, Vr, Fl, Fr, M, I, T): 11(1036).

Other collections: Kamarspa, *Rawi 22210* (BAG, K); above Darimarr, *Gillett 11873* (BAG, K); near Tawella, *Rechinger 10329* (BUH, W); Tawana, *Rawi et al. 29559* (BAG, K); Hawara Barza, *Rawi et al. 29340* (BAG, K).

320. *Erysimum repandum* L.

(A, F, Fr, M, I, S): 11(63), 11(86), 11(352), 11(360), 11(422),
11(1604).

Other collections: 8 km N of Kani Spi, *Rawi 22403* (BAG, K).

321. *Eruca vesicaria* (L.) Cav. subsp. *sativa* (Mill.) Thell.

(* , A, O, Fl, Fr, M, I, S, T): 11(666), 11(1610).

322. *Fibigia clypeata* (L.) Medik.

(P, R, Fl, M, I, S): 12(705), 12(755).

323. *Fibigia macrocarpa* Boiss. (Fig. 5-34)

(P, F, Fl, Fr, M, I, S, T): 11(133), 11(198), 1211(501), 11(941), 12(755), 12(838), 13(68).

Other collections: Zallm, *Rawi and al* 29381 (BAG, K); Kamarspa, *Rawi* 22219 (BAG, K); N of Biyara, *Gillett* 11788 (BAG, K); Tawella, *Rawi* 21909 (BAG, K), *Rechinger* 10279 (BUH, W).



Figure 5-33: *Fibigia macrocarpa* Boiss.

324. *Fibigia multicaulis* (Boiss. & Hoh.) Boiss.

Other collections: Hawraman, *Haussknecht s.n.* (JE).

325. *Fibigia suffruticosa* (Vent.) Sweet

Other collections: N of Biyara, *Gillett* 11799 (BAG, K); Kamarspa, *Rawi* 22175 (BAG, K), above Tawella, *Rechinger* 10381 (BUH, W); Hawraman, *Rawi et al.* 19786 (BAG, K), *Haussknecht s.n.* (JE).

326. *Fibigia umbellata* (Boiss.) Boiss.

Other collections: Hawraman, *Haussknecht s.n.* (JE).

327. *Graellsia saxifragifolia* (DC.) Boiss. subsp. *longistyla* Poulter (Fig. 5-35)

(P, Vr, Fl, Fr, M, I): 12(735).

Other collections: above Darimarr, *Gillett 11884* (BAG, K).



Figure 5-34: *Graellsia saxifragifolia* (DC.) Boiss. subsp. *longistyla* Poulter. 1. Habit. – 2. Branch. – 3. Basal leaves. – 4. Flowers

328. *Hesperis odorata* Dvořák

(P, F, Fl, Fr, M, I): 11(111), 11(123), 11(346), 11(1587), 11(1616)
12(871), 12(1061)

Other collections: N of Halabja, *Rawi 22059* (BAG, K); Hawara Barza, *Rawi et al. 29509* (BAG, K); near Tawella, *Rechinger 10356* (BUH, W).

329. *Hesperis novakii* Dvořák (Fig. 5-36: 1)

(* , P, F, Fl, Fr, M, I, T): 11(1616), 12(1011), 12(1047), 12(1061).

330. *Hesperis kurdica* Dvořák & Hadač

(P, R, Fl, M, I, T): 12(1159).

Other collections: above Darimarr, *Gillett 11872* (BAG, K); above Biyara, *Gillett 11738* (BAG, K); Tawana, *Rawi et al. 29558* (BAG, K).

331. *Hesperis straussii* Bornm. (Fig 5-36: 2)

(P, F, Fl, M, I): 11(1542), 12(661), 12(1542).

Other collection: Kamarspa, *Rawi* 22262, 22263 (BAG, K); Tawella, *Rechinger* 10355 (BUH, W); N spur of Biyara, *Gillett* 11816 (BAG, K).



Figure 5-35: 1. *Hesperis novakii* Dvořák . – 2. *Hesperis straussii* Bornm.

332. *Hirschfeldia incana* (L.) Lagr.-Foss.

(* , A, C, Fl, Fr, M, I, S, T): 11(459), 11(774), 1064).

333. *Isatis buschiana* Schischk.

(* , B, R, Fl, Fr, M, I, T): 11(565).

334. *Isatis cappadocica* Desv. subsp. *steveniana* (Trautv.) Davis (Fig. 5-37)

(P, F, Fr, M, I, S, T): 11(599), 12(1079), 12(621), 13(39).

Other collections: Kamarspa, *Rawi* 22173 (BAG, K).



Figure 5-36: *Isatis cappadocica* Desv. subsp. *steveniana* (Trautv.) Davis. 1. Habit. – 2. Frutis

335. *Isatis lusitanica* L.

(* , A, Fl, Fr, M, I, S, T): 11(100), 11(337), 11(553), 12(132).

336. *Isatis stylophora* (Jaub. & Spach) Hadač & Chtrek.

(A, O, Fl, M, I, S, T): 11(8), 11(104), 13(37).

Other collections: Tawella, *Rechinger 10306* (BUH, W); Kamarspa, *Rawi 22169* (BAG, K).

337. *Lepidium chalepense* L.

(A, O, F, M, I, S, T): 12(1036).

Other collections: Susakan, *Rechinger 10155* (BUH, W); Tawella, *Rechinger 10395* (BUH, W); above Darimarr, *Gillett 11858* (BAG, K).

338. *Lepidium draba* L.

(A, F, Fl, Fr, M, I, S, T): 11(331), 11(606), 11(1216), 12(604).

Other collections: 13 km N Kani Spi, *Rawi 22421* (BAG, K).

339. *Lepidium latifolium* L. (Fig. 5-38)

(* , P, Vr, Fl, M, I, S, T): 12(884).

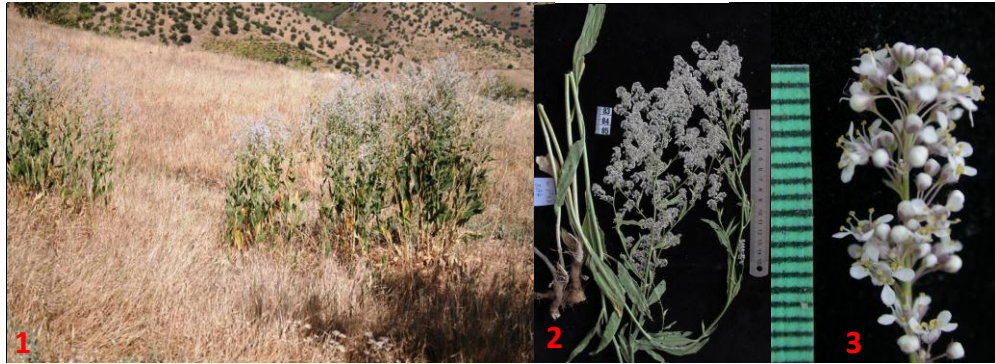


Figure 5-37: *Lepidium latifolium* L. 1. Habit. – 2. Specimens. – 3. Inflorescence

340. *Lepidium perfoliatum* L.

(* , A, R, Fr, M, I, S, T): 12(79), 13(69).

341. *Lepidium persicum* Boiss.

(* , P, Vr, F, Fr, M, I): 12(1151).

342. *Lepidium sativum* L.

(A, R, Fr, M, I, S, T): 12(609).

Other collections: Khurmali, Rawi 8847 (BAG, K).

343. *Microthlaspi perfoliatum* (L.) F.K.Mey.

(* , F, Fl, Fr, M, I, S, T): 11(1), 11(367), 12(10), 13(37).

344. *Myagrurn perfoliatum* L.

(* , A, Vr, Fr, M, I, S, T): 11(691).

345. *Nasturtium officinale* W.T.Aiton

(P, C, Fl, Fr, M, I, S, T): 11(991), 11(1372).

Other collections: Kani Spi, *Rawi* 22388 (BAG, K); Khurmall, *Rawi et al.* 29448 (BAG, K); Tawella, *Rechinger 12351* (BUH, W).

346. *Neslia apiculata* Fisch., C.A.Mey. & Ave-Lall.

(* , A, O, Fl, Fr, M, I, S, T): 11(552), 11(770), 12(184), 12(278), 12(820).

347. *Neurotropis kotschyanum* (Boiss. & Hoh.) F.K.Mey.

(A, F, Fl, Fr, M, I, S, T): 11(146), 11(181), 11(348), 11(494), 12(347), 13(37).

Other collections: Kamarspa, *Rawi* 22226 (BAG, K); Tawella, *Rechinger 10350* (BUH, W); Hawar Barza, *Rawi et al.* 29521 (BAG, K).

348. *Parlatoria cakiloidea* Boiss.

(A, O, Fl, Fr, M, I, T): 11(334), 11(540), 12(678).

Other collections: Hawraman, *Haussknecht s.n.* (JE); Tawella, *Rawi et al.* 29563 (BAG, K); N of *Biyara*, *Gillett* 11791 (BAG, K); Susakan, *Rechinger 10135* (BUH, W); Ballkha, *Rawi* 22363 (BAG, K).

349. *Raphanus sativas* L.

(* , A or B, Fl, M, I, S, T): 11(637).

Cultivated species.

350. *Sisymbrium irio* L.

Other collections: Hawraman, near Tawella, *Rechinger 10392* (BUH, W).

351. *Sisymbrium loeselii* L.

(* , A, F, Fl, Fr, M, I, S, T): 11(650), 11(489), 11(910), 11(920), 11(1535), 12(34).

352. *Sysymbrium officinale* (L.) Scop.

(P, F, Fl, M, I, S, T): 11(158), 11(741), 12(300).

353. *Sisymbrium septulatum* DC.

Other collections: Kani Spi, between Halabja and Tawella, *Rechinger 10392* (BUH, W).

354. *Sinapis arvensis* L.

(* , A, C, Fl, Fr, M, I, S, T): 11(241), 11(679), 11(728), 12(134), 12(150), 12(568), 12(586).

20. Family CAMPANULACEAE

This family is represented in Hawraman by four genera and 13 species, of which seven are new to Hawraman.

355. *Asyneuma persicum* (DC.) Bornm.

(P, F, Fl, M, I, T): 11(1481), 12(1522), 12(1531), 12(1583).

Other collections: Zallm, *Rawi et al. 29376* (BAG, K); Hawraman, *Rawi et al. 19724* (BAG, K).

356. *Asyneuma pulchellum* (Fisch. & C.A.Mey.) Bornm.

(* , B, R, Fl, M, I, T): 12(957).

357. *Campanula ceciliae* Rech.f. & Schiman-Czeika

(A, R, Fl, M, I, T): 12(646), 11(483), 11(1051).

Other collections: near Susakan, *Rechinger 10131* (BUH, W); Tawella, *Rechinger 10252* (BUH, W).

358. *Campanula erinus* L.

(* , A, Vr, Fr, M, I, T): 11(479).

359. *Campanula flaccida* Vatke

Other collections: Dara Tri, *Rawi* 22026 (BAG, K); near Tawella, *Rechinger* 10257 (BUH, W).

360. *Campanula involucrata* Auch. ex DC. (Fig. 5-39: 1)

(P, F, Fl, Fr, M, I, T): 11(1031), 12(389), 12(664), 12(1155).

Other collections: N of Biyara, *Gillett* 11823 (BAG, K); Hawar Barza, *Rawi et al.* 29360 (BAG, K); Hawraman, *Gillett* 11883 (BAG, K).

361. *Campanula perpusilla* DC. (Fig. 5-39: 2)

(* , P, Vr, Fl, M, I, T): 11(299).



Figure 5-38: 1. *Campanula involucrata* Auch. ex DC. – 2. *Campanula perpusilla* DC.

362. *Campanula propinqua* Fisch. & C.A.Mey.

(A, F, Fl, Fr, M, I, T): 11(802), 11(926), 13(41).

Other collections: 10 km W of Tawella, *Rawi* 22121 (BAG, K); Tawella, *Rawi* 21919 (BAG, K); Dara Tri, *Rawi* 21990 (BAG, K); Khurmalla, *Rawi* 8442 (BAG, K); N of Halabja, *Rawi* 22071 (BAG, K).

363. *Campanula radula* Fisch. ex Fenzl var. *minor* Boiss.

Other collections: Zallm, *Rawi et al. 19740* (BAG, K).

364. *Campanula retrorsa* Labill.

(* , A, R, F, M, S, T): 11(657), 12(194).

365. *Campanula sclerotricha* Boiss.

(* , P, O, Fl, M, I, T): 11(1522), 12(1316).

366. *Legousia falcata* (Ten.) Fritsch ex Janch.

(A, F, Fl, M, I, S, T): 12(348).

Other collections: Hawraman, *Hausknecht s.n.* (JE).

367. *Legousia speculum-veneris* (L.) Chaix

(* , A, F, Fl, M, I, S, T): 12(379).

368. *Michauxia laevigata* Vent.

(A, F, Fl, Fr, M, I, S, T): 11(1106), 11(1058), 12(685), 12(862),
12(928).

Other collections: Tawella, *Rawi 21908* (BAG, K), *Rechinger 10266* (BUH, W).

369. *Michauxia nuda* DC.

(* , O, Fl, M, S): 12(855).

21. Family CAPPARACEAE

This family is represented in Hawraman by one genus, one species and three varieties, of which two are new records for the mountain. It currently includes both Dipsacaceae and Vallerianaceae.

370. *Capparis spinosa* L. var. *canescens* Coss.

(* , P, O, Fl, M, I, S, T): 11(1154), 12(463).

371. *Capparis spinosa* L. var. *leucophylla* (DC.) Boiss.

(* , P, C, Fl, Fr, M, I, S, T): 11(1128), 12(1270).

372. *Capparis spinosa* var. *parviflora* (Boiss.) Boiss.

Other collections: Halabja, *Guest 12930* (BAG, K); above Khurmall, *Hadač 5025* (BUH, PR); Susakan, *Khatib and Tikriti 29756* (BAG, K).

22. Family CAPRIFOLIACEAE (DIPSACACEAE)

This family is represented in Hawraman by seven genera and 18 species, of which three are new to Hawraman.

373. *Cephalaria dichaeophora* Boiss.

(A, O, Fl, Fr, M, I, S, T): 11(1579), 13(121).

Other collections: near Tawella, *Rechinger 10256* (BUH, W); Zallm, *Rawi et al. 29418* (BAG, K).

374. *Cephalaria microcephala* Boiss.

Other collections: Hawraman, *Rawi et al. 19797* (BAG, K).

375. *Cephalaria setosa* Boiss. & Hohen.

(A, F, Fl, Fr, M, I, T): 11(1199), 12(856), 12(931), 12(1266).

Other collections: Hawraman, *Hausknecht s.n.* (JE).

376. *Cephalaria syriaca* (L.) Schrad.

(A, F, Fl, M, I, S, T): 11(738), 11(1061), 12(544).

Other collections: Halabja, *Ahmad & Jabar 50118* (BAG, K).

377. *Dipsacus laciniatus* L. (Fig. 5-40).

(* , P, Vr, Fl, M, I, S, T): 11(1546), 12(1623).

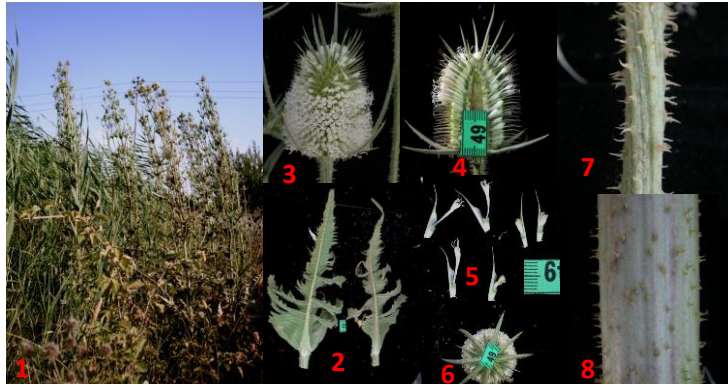


Figure 5-39: *Dipsacus laciniatus* L. 1. Habit. – 2. Leaves. – 3 and 4. Heads. – 5. Flowers. – 6. Bracts. – 7 and 8. Stem indumentum

378. *Lonicera arborea* Boiss.

(P, C, Fl, Fr, M, I, S, T): 12(691), 12(920), 12(1189),
12(1358), 12(1428), 12(1526).

Other collections: Tawella, *Rawi 12208* (BAG, K), *Rechinger 12407* (BUH, W); Kamarspa, *Rawi 22228* (BAG, K); Hawraman, *Rawi et al. 29517* (BAG, K), *Hausknecht s.n.* (JE).

379. *Pterocephalus canus* Coult. ex DC. (Fig. 5-41: 1)

(P, R, Fl, Fr, I, S, T): 11(1050), 11(1486), 12(1103).

Other collections: near Tawella, *Rechinger 10249* (BUH, W); Dara Tri, *Rawi 22011-A* (BAG, K).

380. *Pterocephalus kurdicus* Vatke (Fig. 5-41: 2)

(P, F, Fl, Fr, M, I, T): 11(1492), 12(925), 12(1098), 12(1395).

Other collections: Zallm, *Rawi et al.* 29384 (BAG, K); Hawraman, *Hauskencht s.n.* (JE).



Figure 5-40: 1. *Pterocephalus canus* Coult. ex DC.; *Pterocephalus kurdicus* Vatke

381. *Pterocephalus plumosus* (L.) Coult.

(A, F, Fl, Fr, M, I, S, T): 11(748), 11(972), 11(1587), 12(383),
12(412), 12(875), 12(1044).

Other collections: Susakan, *Rechinger 10138* (BUH, W); above Darimarr, *Gillett 11847* (BAG, K); 10 km W of Tawella, *Rawi 22147* (BAG, K).

382. *Pterocephalus pyrethrifolius* Boiss. & Hohen.

Other collections: Hawraman, *Rawi et al.* 19790 (BAG, K).

383. *Scabiosa macrochaete* Boiss. & Hausskn.

(* , A, F, Fl, M, I, T): 11(1032), 12(620), 12(793).

384. *Scabiosa palaestina* L.

(A, F, Fl, M, I, S, T): 12(491), 12(588).

Other collections: near Tawella, *Rechinger 12422* (BUH, W).

385. *Scabiosa persica* Boiss.

(* , F, Fl, M, I, T): 11(816), 12(683).

386. *Valeriana sisymbriifolia* Vahl

Other collections: Hawraman, *Haussknecht s.n.* (JE).

387. *Valerianella dactylophylla* Boiss. & Hohen. (Fig. 5-42)

(A, O, F, Fr, I, T): 13(48).



Figure 5-41: *Valerianella dactylophylla* Boiss. & Hohen. 1. Habit. – 2. Fruits

Other collections: Kamarspa, *Rawi* 22232 (BAG, K); above Tawella, *Rechinger* 10317 (BUH, W).

388. *Valerianella kotschyi* Boiss.

Other collections: Khurmall, *Rawi s.n.* (BAG, K).

389. *Valerianella muricata* (Stev.) W.Baxt.

Other collections: Halabja, *Rawi* 8872 (BAG, K).

390. *Valerianella tuberculata* Boiss.

(* , A, R, Fr, M, I, S, T): 11(1046).

391. *Valerianella vesicaria* (L.) Moench

Other collections: Tawella, *Rawi s.n.* (BAG, K).

23. Family Caryophyllaceae

This family is represented in Hawraman by 15 genera and 55 taxa, of which 14 are new to this mountain and two are new to Iraq.

392. *Acanthophyllum caespitosum* Boiss.

(P, R, Fl, M, I): 11(837), 12(1325), 13(83).

Other collections: Susakan, *Rechinger 10180* (BUH).

393. *Acanthophyllum kurdicum* Boiss. & Hausskn. (Fig. 5-43)

(* , P, Vr, Fl, M, I): 12(1532).



Figure 5-42: *Acanthophyllum kurdicum* Boiss. & Hausskn.

The species was previously collected from Haj Omran and Piramagrun but not from Hawraman.

394. *Ankyropetalum gypsophiloides* Fenzl

(P, F, Fl, Fr, M, I, S, T): 11(1105), 11(1366), 12(477).

Other collections: near Tawella, *Rechinger 12394* (BUH, W).

395. *Arenaria leptoclados* (Rchb.) Guss.

Other collections: near Tawella, *Rechinger 12365a, b* (BUH, W).

396. *Buffonia calycina* Boiss. & Hausskn.

Other collections: Hawraman, *Haussknecht s.n.* (JE).

This endemic of Hawraman Iraq and Iran is known from only three collections, of which one was made from the Iraqi side.

397. *Buffonia oliveriana* Ser.

(A, Fl, M, I, T): 11(1613).

Other collections: Hawraman, *Haussknecht s.n.* (JE).

The species is widespread in Kurdistan of Iraq and Iran.

398. *Cerastium dichotomum* L.

(A, F, Fl, Fr, M, I, S, T): 12(859), 12(337), 12(553), 12(776), 12(859), 13(64).

Other collections: near Tawella, *Rechinger 12356, 12375a* (BUH, W).

399. *Cerastium fragillimum* Boiss.

(* , P, O, Fr, M, T): 11(998), 11(10480), 12(1057).

The species was previously collected from Kurdistan Iraq only near Shaklawa.

400. *Cerastium glomeratum* Thuill.

(A, R, Fl, M, I, T): 11(568), 13(81).

Specimen examined: Tawella, *Rechinger 12374* (BUH, W).

401. *Cerastium inflatum* Link ex Desf.

(A, F, Fl, M, I, T): 11(371), 12(377).

Specimen examined: near Tawella, *Rechinger 12375-B* (BUH, W).

402. *Dianthus masmenaeus* Boiss. var. *glabrescens* Boiss. (Fig. 5-44)

(* , P, Vr, Fl, M, I, T): 12(393), 12(799).



Figure 5-43: *Dianthus masmenaeus* Boiss. var. *glabrescens* Boiss. 1. Habit. – 2 and 3. Cymes. – 4. Opened flower. – 5. Involucral bracts

403. *Dianthus orientalis* Adams subsp. *macropetalus* (Boiss.) Rech.f.

(P, F, Fl, M, I, S, T): 11(1490), 11(1567), 11(1599), 12(1391),
12(1481), 12(1507).

Other collections: Hawraman, *Hausskencht s.n.* (JE).

404. *Dianthus orientalis* Adams subsp. *nassireddini* (Stapf) Rech.f.

(* , P, O, Fl, Fr, M, I, T): 11(760), 12(921), 12(1110), 12(1517).

This subspecies, treated by some as *Dianthus fimbriatus* M.Bieb. var. *brachyodontus* Boiss. & Huet, was previously collected from Helgurd, Qandil, and Sakri Sakran mountains but not from Hawraman.

405. *Dianthus siphonocalyx* Blakelock

(* , P, F, Fl, Fr, M, T): 11(1469), 12(1008), 12(1110),
12(1536).

406. *Dianthus strictus* Banks & Sol. var. *gracilior* (Boiss.) Reeve

(P, C, Fl, Fr, M, S, T): 11(1092), 11(1185), 11(1405),
12(1440), 12(1464).

Other collections: near Khurmall, *Hadač s.n.* (BUH, PR).

407. *Dianthus strictus* Banks & Sol. var. *strictus*

(* , P, C, Fl, Fr, M, S, T): 11(329), 11(1111), 12(492),
12(873).

408. *Gypsophila polyclada* Fenzl ex Boiss.

(P, F, Fl, Fr, M, I, T): 11(954), 11(1205), 11(646), 12(935).

Other collections: Hawraman, *Hausknecht s.n.* (JE).

409. *Gypsophila sarbaghia* S.A.Ahmad, sp. nov. TYPE: Iraq, Kurdistan, Sulaimani Province, Dalane Mountain, 35°20'01"N, 46°07'36"E, 2506 m, limestone rocks and cliffs, 18 July 2012, *Saman A. Ahmad 12-1546* (holotype, SUFA). (Fig.5-44)

(***, P, Vr, Fl, Fr): 11(1110), 12(1546).

Perennial herbs; caudex woody, compactly branched, with stem and leaf remains of previous seasons. Stems 15–35 cm, glabrous throughout, erect, rigid, slender, simple or rarely few branched distally. Basal leaves not rosulate, linear, few, often withered at anthesis, 1-veined; cauline leaves linear, 3–7 × ca. 0.5 mm, membranous at base, 1-veined, glabrous. Flowers 2–6, in simple or rarely branched inflorescence, appressed, subsessile, subtended by 2 or 3 pairs of subulate leaves; calyx tubular, 5–7 mm, obscurely veined, membranous to base between lobes, moderately short pilose; teeth purplish, subacute, ca. 0.5 mm; petals white 7–9 ca. 1 mm, obtuse, undifferentiated into blade and claw;

stamens 7–9 mm, exerted. Fruit obovoid, becoming campanulate when dehisced, ca. 5×2.5 mm, glossy, glabrous; mature seeds not seen.

Gypsophila sarbaghiae is named in honor of Dr. Sarbagh Salih, President of the Kurdistan Botanical Foundation, in appreciation for her continuous support throughout the present study.

This novelty is easily distinguished from all 47 species treated in Flora Iranica (Rechinger, 1988) and 46 species treated by Huber-Morath (in Davis, 1967) by a combination of having compactly branched caudex; glabrous parts except sepals; rather slender, rigid, erect stems; sessile flowers in a monochasium; shortly pilose, tubular calyx; white, linear petals; and obovoid fruits.

Paratype: Iraq, Kurdistan, Sulaimani Province, above Ahmad Awa, $35^{\circ}19'07''\text{N}$, $46^{\circ}05'48''\text{E}$, 1050 m, 7 April 2011, *Saman A. Ahmad 11-1110* (SUFA).

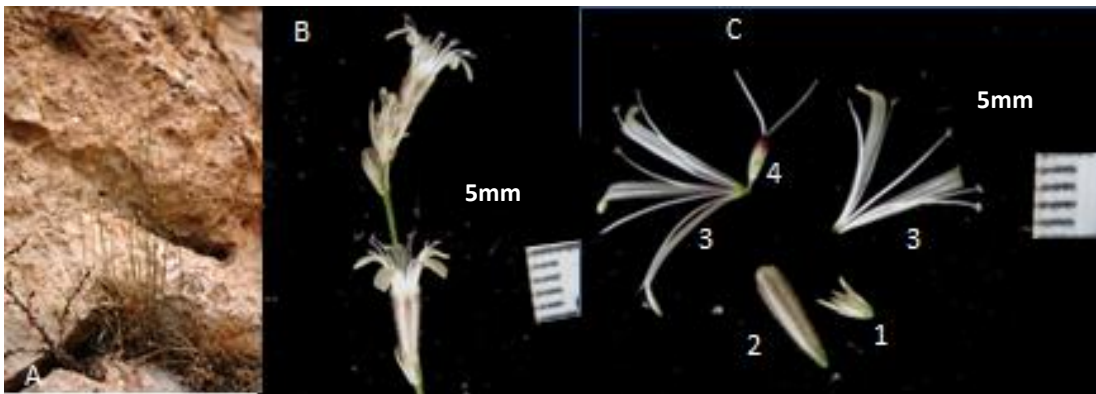


Figure 5-44: *Gypsophila sarbaghiae* S.A.Ahmad: A. Habit – B. part of a monochasium – C. dissected flower showing bracts (1), calyx (2), petals and stamens (3), and pistil (4).

410. *Gypsophila obconica* Barkoudah

(* , P, O, Fr, I): 12(1009), 12(1390).

411. *Holosteum umbellatum* L.

(* , A, O, Fl, Fr, M, I, S, T): 11(80), 11(350).

412. *Mesostemma kotschyannum* (Fenzl) Vved.

(P, R, Fl, Fr): 12(633), 12(733), 12(1135), 12(1386).

Other collections: near Tawella, *Rechinger 10372* (BUH, W).

413. *Minuartia hybrida* (Vill.) Schischk.

(A, F, Fl, Fr, M, I, S, T): 11(277), 11(473), 11(759), 12(217).

Other collections: near Tawella, *Rechinger 12365-B, 12412* (BUH, W).

414. *Minuartia meyeri* (Boiss.) Bornm.

Other collections: near Tawella, *Rechinger 10298* (BUH, W).

415. *Minuartia sublineata* Rech.f.

Other collections: Hawraman, *Hausknecht s.n.* (JE).

This Kurdistan endemic was also collected from Helgurd and Qandil Mts., as well as from NW Iran.

416. *Petrorhagia cretica* (L.) Ball & Heywood

Other collections: Susakan, *Rechinger 10187* (BUH, W).

417. *Silene ampullata* Boiss.

(P, F, Fl, M, I, S, T): 11(515), 11(853), 13(60).

Other collections: near Tawella, *Rechinger 10216, 10321* (BUH, W).

418. *Silene araratica* Schischk.

(P, R, Fl, Fr, M, T): 12(1119), 12(1521).

Other collections: Hawraman, *Rawi 19747, 19752, 19773* (BAG, K).

This species is endemic to Kurdistan of Iraq, Iran, and Turkey.

419. *Silene aucheriana* Boiss.

(P, R, Fl, M, I, T): 11(1009).

Other collections: Kamarspa, *Rawi 22211* (BAG, K); near Tawella, *Rechinger 10331* (BUH, W).

Both *Silene aucheriana* and *S. montbretiana* Boiss were simultaneously published, and there is a discrepancy between the Flora of Turkey and Flora Iranica as to the limits of the species and their distribution. The latter flora is followed in this thesis.

420. *Silene avramana* Boiss. & Hausskn.

(P, Vr, Fl, I): 12(116).

This species is Endemic to Kurdistan Iraq and Iran. it is very rare and grows in a very restricted geographical area. It was collected by Haussknecht (type collection) in “M. Hawraman et Shahu”, but his collection could have easily been made across the border in Iran. Therefore, the single collection made in this study confirms its occurrence in Kurdistan Iraq.

421. *Silene commelinifolia* Boiss.

Other collections: Hawraman, *Haussknecht s.n.* (JE).

The species was collected several times from Pira Magrun, Helgurd, and Botin.

422. *Silene coniflora* Nees ex Otth

(**, A, F, Fl, Fr, M, I, S, T): 11(963), 11(1013), 12(1028),
12(1046).

Description: Plants annual. Stems (3.5–)7–16(–25) cm tall, often branched from base, pubescent below, glandular above. Basal leaves 12–30 × 2.5–6 mm, linear to lanceolate, 1-veined; cauline leaves (15–)20–42(–60) mm, lanceolate to rarely linear, 1-veined. Inflorescences dichasium, (2–)5–30-flowered; bracts linear; pedicels 6–12 mm. Calyx (9–)11.5–15.5(–17) mm, ovate to narrowly so, 15–20-veined, constricted above, basally inflated, glandular; teeth 3–6 mm, subulate, green veined. Petals white to pink, limb 4–6 mm, emarginate to shallowly 2-lobed; claw 10–13 mm; scales strongly reduced. Filaments ciliate at base. Fruits 8–13 × 4.5–6.5 mm, sessile, ovoid-oblong, enclosed in calyx.

The species is widespread from the Mediterranean Region eastward into Afghanistan and Pakistan. The above collections represent the first record for Iraq.

423. *Silene conoidea* L.

(A, F, Fl, Fr, M, I, T): 11(309), 11(556), 12(595), 12(208).

Other collections: near Tawella, *Rechinger 10340* (BUH, W).

424. *Silene dichotoma* Ehrh. subsp. *dichotoma* (Fig. 5-45: 1)

(P, F, Fl, Fr, M, I, T): 11(989), 11(1414), 12(414), 12(617),
12(866), 12(1013).

Other collections: near Susakan, *Rechinger 10161-B* (BUH, W).

This and the following subspecies grow in Hawraman and both were collected once by Rechinger. Subspecies *dichotoma* is distinguished from subsp. *racemosa* by having dense (vs. sparse) multicellular hairs on the calyx veins and by having both leaf surfaces equally pubescent with appressed, crisped trichomes (vs. sparsely pubescent upper surface and densely pubescent lower surface).

425. *Silene dichotoma* subsp. *racemosa* (Otth) Graebn. & P.Graebn.

Other collections: near Susakan, *Rechinger 11526* (BUH, W).

426. *Silene eriocalycina* Boiss.

(P, R, Fl, M, I, S, T): 12(988).

Other collections: Tawella, *Rawi 21954* (BAG, K).

427. *Silene latifolia* Poir. subsp. *alba* (Mill.) Greuter & Burdet (Fig. 5-46)

(* , P, R, Fl, Fr, M, T): 12(952).

Silene latifolia is a variable species divided into several subspecies, of which three grow in Kurdistan Iraq. In subsp. *eriocalycina* (Boiss.) Greuter & Burdet the fruiting calyx is not inflated, and it is pilose with glandular and eglandular trichomes 1–1.7 mm long. In both subsp. *alba* and *persica* (Boiss. & Buhse) Melzh. the fruiting calyx is somewhat inflated and covered with richomes rarely reaching 0.7 mm long. Subspecies *alba* has long acuminate leaves with acute apex, whereas subsp. *persica* has short acuminate leaves with obtuse apex.



Figure 5-45: *Silene latifolia* Poir. subsp. *alba* (Mill.) Greuter & Burdet. 1. Habit. – 2. Flower. – 3. Fruits in persistent calyx

428. *Silene latifolia* Poir subsp. *latifolia*

(* , P, O, Fr, M, I, T): 12(616).

429. *Silene microphylla* Boiss.

(* , P, R, Fl, M, I): 12(732), 12(1363).

The species was previously collected only from Qandil Mountains.

430. *Silene microsperma* Fenzl

(A, R, Fr, M, I): 11(468).

Other collections: Hawraman, *Hausskenckt s.n.* (JE).

431. *Silene montbretiana* Boiss.

(P, O, Fl, M, T): 12(669).

432. *Silene odontopetala* Fenzl subsp. *congesta* (Boiss.) Melzh.

Other collections: Hawraman, *Rawi et al 19746* (BAG, K).

433. *Silene oreophila* Boiss.

(* , P, R, Fl, Fr, M, S, T): 12(1362).

434. *Silene pruinosa* Boiss.

(* , P, Vr, Fl, M, S, T): 11(523).

435. *Silene sisianica* Boiss. & Buhse

Other collections: Hawraman, *Haussknecht s.n.* (JE).

436. *Silene swertiifolia* Boiss.

(P, R, Fl, Fr, M, I, S, T): 11(898), 11(1010), 11(1487), 12(984),
12(1108).

Other collections: Susakan, *Rechinger 10175* (BUH, W); near Tawella, *Rawi 21928* (BAG, W), *Rechinger 10365* (BUH, W).

437. *Silen vivianii* Steud.

(* , A, O, Fl, M, I): 11(213)

In addition to being the first record for Hawraman, the above record is the first for Sulaimani Province.

438. *Silene* sp. 1

(P, R, Fr): 12(1398).

439. *Silene* sp. 2

(P, R, Fl): 12(1117).

440. *Stellaria media* (L.) Vill.

(A, F, Fl, M, I, S, T): 11(744).

Other collections: near Tawella, *Rechinger 12428* (BUH, W).

441. *Stellaria pallida* (Dumort.) Pire

(A, F, Fl, Fr, M, I): 11(109), 11(194), 11(375).

Other collections: near Tawella, *Rechinger 12428* (BUH, W).

442. *Vaccaria grandiflora* (Fisch. ex DC.) Jaub. & Spach

(* , A, O, Fl, M, T): 11(207), 12(827).

443. *Vaccaria hispanica* (Mill.) Rauschert

(* , A, F, Fl, M, I, T): 11(318), 11(841), 12(641),
12(207).

444. *Vaccaria oxyodonta* Boiss.

(A, F, Fl, M, I, T): 11(904), 12(826).

Other collections: Susakan, Rechinger 10140, 10198 (BUH, W).

445. *Velezia rigida* L.

(A, F, Fl, M, T): 11(754), 11(781), 11(901), 13(119).

Other collections: Susakan, Rechinger 10144 (BUH, W).

24. Family CERATOPHYLLACEAE

This aquatic family is represented in Hawraman by one genus and one species first recorded herein for the mountain.

446. *Ceratophyllum demersum* L.

(* , P, O, Fl, M, I, S, T): 11(699).

25. Family CISTACEAE

This family is represented in Hawraman by one genus and three species, of which one is new to Hawraman.

447. *Helianthemum aegyptiacum* (L.) Mill.

(* , A, F, Fl, M, I, S, T): 11(88), 11(376), 11(597).

448. *Helianthemum ledifolium* (L.) Mill.

(A, F, Fl, Fr, M, I, S, T): 11(878), 11(961), 11(997), 11(1053),
12(272), 12(424).

Other collections: Tawella, Rechinger 12395 (BUH, W).

449. *Helianthemum salicifolium* (L.) Mill.

(A, O, Fr, M, I, S, T): 12(95).

Other collectins: Tawella, *Rechinger 12450* (BUH, W).

26. Family CLEOMACEAE

This family is represented in Hawraman by one genus and one species not previously recorded from Hawraman.

450. *Cleome noeana* Boiss. (Fig. 5-47)

(* , A, R, Fr, M, I)



Figure 5-46: *Cleome noeana* Boiss. 1. Habit. – 2. Fruits

27. Family COLCHICACEAE

This family is represented in Hawraman by one genus and two species.

451. *Colchicum kotschyi* Boiss. (Fig. 5-48: 1)

(P, C, Fl, Fr, M, I, T): 11(10), 12(261), 12(1633).

Other collections: Hawraman, *Rawi et al. 19728* (BAG, K); near Tawella, *Rechinger 12379* (BUH, W).

452. *Colchicum persicum* Baker (Fig. 5-48: 2)

(P, R, Fr, M, I): 12(261).



Figure 5-47: 1. *Colchicum kotschyi* Boiss. 2. *Colchicum persicum* Baker

28. Family CONVULVACEAE

This family is represented in Hawraman by four genera and 12 taxa, of which seven are new to Hawraman.

453. *Calystegia sepium* (L.) R.Br. (Fig. 5-49: 1).

(* , P, R, Fl, Fr, I, S, T): 11(1142), 12(1205), 12(1452).

454. *Convolvulus arvensis* L.

(P, C, F, M, I, S, T): 11(316), 11(686), 11(924), 11(1237),

11(1440), 12(50), 12(915), 12(958), 12(1575).

Other collections: Susakan, *Rechinger 10195* (BUH, W).

455. *Convolvulus betonicifolius* Mill.

(P, R, Fl, Fr, M, I, S, T): 12(203).

Other collections: Halabja, *Rawi* 8825 (BAG, K)

456. *Convolvulus chondrilloides* Boiss. var. *chondrilloides*

(* , P, R, Fl, M, I, T): 12(490).

457. *Convolvulus hirsutus* Stev.

Other collections: Halabja, *Rawi* 8825 (BAG, K).

458. *Convolvulus pentapetaloides* L. (Fig. 5-49: 2).

(A, F, Fl, Fr, M, I, S): 11(261), 11(440), 12(232).

Other collections: Halabja, *Rawi* 8875-A (BAG, K); Khurmali, *Rawi* 8853 (BAG, K).



Figure 5-48: 1. *Calystegia sepium* (L.) R.Br. – 2. *Convolvulus pentapetaloides* L.

459. *Convolvulus pilosellifolium* Desr.

(* , P, F, Fr, M, I, S, T): 12(478), 12(1225), 12(1465).

460. *Convolvulus stachydifolius* Choisy

(* , A, F, Fl, Fr, M, I, S, T): 11(248), 12(238).

461. *Cuscuta babylonica* Aucher ex Choisy

(* , P, O, F, M, I, S, T): 12(989), 12(1393), 12(1142).

462. *Cuscuta brevistyla* A.C.H. Braun ex A. Rich.

(F, Fl, M, I, T): 11(446), 12(317), 12(955).

Other collections: near Tawella, *Rechinger 12385* (BUH, W).

463. *Cuscuta monogyna* Vahl

(* , P, F, F, M, I): 12(1401).

464. *Cuscuta* sp.

(A, F, V): 11(696).

465. *Ipomoea purpurea* (L.) Roth

(* , P, F, Fl, M): 11(1521).

Cultivated ornamental in Biyara orchards.

29. Family CORNACEAE

This family is represented in Hawraman by one genus, one species with one subspecies.

466. *Cornus sanguinea* L. subsp. *australis* (C.A.Mey.) Jav.

(R, Fr, M, I, T): 11(1380), 12(1319)

Other collections: Hawraman, *Rawi et al. 12716* (BAG, K); near Tawella, *Rechinger 12381* (BUH, W).

30. Family CRASSULACEAE

This family is represented in Hawraman by three genera and seven species (one with two subspecies), of which two are new to Hawraman.

467. *Rosularia sempervivum* (Beib.) Berger subsp. *kurdica* Eggli (Fig. 5-50: 1)

(P, F, Fl, Fr, M, I, T): 11(749), 12(672), 12(762), 12(781),
12(834), 12(1071).

Other collections: Kamarspa, *Rawi* 22198 (BAG, K).

468. *Rosularia sempervivum* (Beib.) Berger

Other collections: Tawella, *Rawi* 21938, 21962 (BAG, K); N of Biayara, *Gillett* 11773 (BAG, K); near Tawella, *Rechinger* 10262 (BUH, W).

469. *Sedum caespitosum* (Cav.) DC.

(* , A, F, Fl, Fr, M, S, T): 11(456), 12(161), 13(70).

470. *Sedum hispanicum* L,

(A, R, Fl, M, I, T): 12(288).

Other collections: Tawella, *Rawi* 21930 (BAG, K).

471. *Sedum rubens* L.

(* , A, R, Fl, M, I, T): 11(304).

472. *Umbilicus intermedius* Boiss. (Fig. 5-50: 2)

(P, C, Fl, Fr, M, I, S, T): 11(805), 12(520), 12(849).

Other collections: Tawella, *Rawi 21907* (BAG, K); near Tawella, *Rechinger 10261* (BUH, W); Khurmall, *Rawi 8914* (BAG, K); Ahmad Awa, *Omar et al. 49399* (BAG, K); 7 km W of Tawella to Halabja, *Rawi 21855* (BAG, K).



Figure 5-49: 1. *Rosularia sempervivum* (Beib.) Berger subsp. *kurdica* Eggl; 2. *Umbilicus intermedius* Boiss.

473. *Umbilicus tropaeolifolius* Boiss.

(P, R, Fl, Fr, M, I, T): 11(303), 12(361).

Other collections: Susakan, *Rechinger 10190* (BUH, W).

31. Family CUCURBITACEAE

This family is represented in Hawraman by two genera and two species.

474. *Bryonia multiflora* Boiss. & Heldr.

(P, F, Fl, Fr, M, I, S, T): 11(112), 11(377), 11(408), 11(507),
11(985), 11(1453).

Other collections: Susakan, *Rechinger 10173* (BUH, W).

475. *Cucumis melo* L.

Other collections: near Halabja, *Guest 12929* (BAG, K).

The above collection is based on wild plants of the species, though the species is widely cultivated for its fruits (cantaloupe).

32. Family Cupressaceae

This family is represented in Hawraman by one genus and one cultivated species not previously recorded from the area.

476. *Cupressus sempervirens* L.

(* , P, F, “Fr,” M, I, S, T): 11(1542).

33. Family CYPERACEAE

This family is represented in Hawraman by seven genera and 18 species, of which six are new to Hawraman.

477. *Bolboschoenus maritimus* (L.) Palla

(P, C, Fl, Fr, M, I, S, T): 11(221), 11(1149), 12(62), 12(1172).

Other collections: 13 km from Halabja to Sulaimaniya, *Nuri and Hamad* 41220 (BAG, K).

478. *Carex acutiformis* Ehrh.

(* , P, R, Fl, M, S, T): 11(223).

479. *Carex diluta* M.Bieb.

(* , P, F, Fl, M, I, T): 11(48), 11(162).

480. *Carex distans* L.

Other collections: 10 km W of Halabja, *Barkley 7541* (BUA, W).

481. *Carex divisa* Huds.

(* , P, O, Fl, Fr, M, I, S, T): 11(1292).

482. *Carex divulsa* Stokes subsp. *leersii* (Kneuck.) W.Koch

(P, F, Fl, Fr, M, I): 11(185), 11(419), 11(915), 12(1246).

Other collections: Tawella, *Rawi 21896* (BAG, K); near Tawella, *Rechinger 12137 a, b* (BUH, W); 10 km W of Halabja, *Barkley 7540 p.p.* (BUA, W).

483. *Carex otrubae* Podp.

(P, Fl, Fr, M, I, S): 11(633), 11(1091), 11(1418).

Other collections: Khurmall, *Hadač 5031* (BUH, PR); 10 km W of Halabja, *Barkely 7540 p.p.* (BUA, W).

484. *Carex pachystylis* J.Gay

Other collections: near Tawella, *Rechinger 12373* (BUH, W).

485. *Carex polyphylla* Kar. & Kir.

(* , P, R, Fr, M, I, T): 11(746), 12(205), 12(285).

486. *Cyperus fuscus* L.

(* , P, Fl, Fr, M, I, S, T): 11(1306), 11(1370), 12(1616).

487. *Cyperus longus* L. var. *pallidior* Kükenth.

(P, O, Fl, M, I, S, T): 11(403), 11(1148), 11(1404), 12(1184).

Other collections: Khurmall, *Rawi et al. 29449* (BAG, K); near Khurmall, *Hadač 5053* (BUH, PR).

488. *Cyperus rotundus* L.

(* , P, F, Fl, M, I, S, T): 12(906).

489. *Cyperus* sp.

(P, O, Fl, M): 11(1310).

490. *Eleocharis palustris* (L.) Roem. & Schult.

Other collections: 10 km W of Halabja, *Barkley* 7528 (BUA, K).

491. *Fimbristylis bisumbellata* (Forssk.) Bub.

(A, O, Fl, M, I, S, T): 12(1619).

Other collections: Zallm, *Rawi et al.* 29496 (BAG, K).

492. *Schoenoplectus litoralis* (Schrad.) Palla (Fig. 5-51: 1)

(P, F, Fl, M, I, S): 12(1215).

Other collections: Khurmall, *Rawi* 8887 (BAG, K).

493. *Schoenoplectus lacustris* (L.) Palla.

(**, P, F, Fl, I, T): 11(401).

A detailed description of the species was given by Hooper (in Townsend et al., 1985) and Kukkonen (in Rechinger, 1998) and needs not be repeated here. Hooper (l.c.) mentioned that the species is of doubtful distribution in Iraq, and that the previous collection made by Handel-Mazzetti from Mosul was apparently lost during World War II.

494. *Scirpoides holoschoenus* (L.) Soják (Fig. 5-51: 2)

(P, F, Fl, Fr, M, I, S, T): 11(823), 11(1341), 11(1409).

Other collections: Khurmall, *Rawi* 8930 (BAG, K); near Tawella, *Rechinger* 15834 (BUH, W).



Figure 5-50: *Schoenoplectus litoralis* (Schrad.) Palla. – 2. *Scirpoides holoschoenus* (L.) Sojak

34. Family DIOSCOREACEAE

This family is represented in Hawraman by one genus and one species.

495. *Tamus communis* L.

(P, F, Fl, Fr, M, I, S, T): 11(318), 11(711), 11(1529), 12(446),

12(1081).

Other collections: Susakan, *Rechinger 10150* (BUH, W).

35. Family DRYOPTERIDACEAE

The family is represented in Hawraman by one genus and one species.

496. *Polystichum setiferum* (Forssk.) Woyнар

Other collections: Hawraman, *Haussknecht s.n.* (JE).

36. Family EBENACEAE

This family is represented in Hawraman by one genus and one species

497. *Diospyros kaki* L. (Fig. 5-52)

(* , P, Vr, Fr, M, I, T): 11(917), 11(1533).



Figure 5-51: *Diospyros kaki* L. 1. Habit. – 2. Bark. – 3. Flowers. – 4. Fruits

The species is cultivated for its edible fruits.

37. Family EUISETACEAE

This family is represented in Hawraman by one genus and one species and recorded for the first time from this mountain.

498. *Equisetum ramosissimum* Desf. (Fig. 5-53)

(* , P, F, V, M, I, S, T): 11(49), 11(219), 11(654), 11(1173),
11(1431).



Figure 5-52: *Equisetum ramosissimum* Desf. 1. Habit. – 2. Inflorescences

38. Family EUPHORBIACEAE

This family is represented in Hawraman by three genera and 18 species, of which four are new to Hawraman.

499. *Andrachne aspera* Spreng. (Fig. 5-54: 1)

(* , P, F, Fl, Fr, M, I, S, T): 11(968), 11(1367), 12(340),
12(682), 12(927).

500. *Andrachne telephioides* L.

(A, F, Fl, Fr, M, I, S, T): 11(1441), 11(1567), 12(1228).

Other collections; Dara Tri, *Rawi 22021* (BAG, K); Tawella, *Rechinger 12364* (BUH, W).

501. *Crozophora tinctoria* (L.) Raf. (Fig. 5-54: 2)

(A, F, Fr, M, I, S, T): 11(1138), 11(1356), 12(910), 12(1314),
12(1233), 12(1314), 12(1609).

Other collections: Hawraman, *Hausknecht 441* (JE).



Figure 5-53: 1. *Andrachne aspera* Spreng. – 2. *Crozophora tinctoria* (L.) Raf.

502. *Euphorbia aleppica* L.

(* , A, F, Fl, M, I, S, T): 11(1534).

503. *Euphorbia chamaesyce* L.

Other collections: between Saiyid Sadiq and Halabja, *Karim 39310* (BAG, K); Hawraman, *Rawi et al. 19830* (BAG, K).

504. *Euphorbia cheiradenia* Boiss. & Hoh.

(P, F, Fl, Fr, M): 11(952), 12(899), 12(1010).

Other collections: Halabja, *Rawi* 8952 (BAG, K); Kamarspa, *Rawi* 22265 (BAG, K); N of Halabja, *Rawi* 22064 (BAG, K); Hawra Birza, *Rawi et al.* 29508 (BAG, K); near Tawella, *Rechinger* 10251 (BUH, W); Naragora, 2 km NE of Ballkha, *Rawi et al.* 29549 (BAG, K).

505. *Euphorbia condylocarpa* M.Bieb.

Other collections: Hawraman, *Gillett* 11840 (BAG, K); Kamarspa, *Rawi* 22202 (BAG, K); Tawella, *Rechinger* 10380 (BUH, W).

506. *Euphorbia denticulata* Lam. (Fig. 5-55: 1)

(P, F, Fl, Fr, M, I, S, T): 11(105), 11(329), 11(1028),

11(1589).

Other collections: N or Halabja, *Rawi* 22099 (BAG, K); Kamarspa, *Rawi* 22229 (K); Tawella, *Rawi* 22294 (K); near Tawella, *Rechinger* 10347 (BUH, W).

507. *Euphorbia falcata* L.

(A, O, Fl, M, I, S, T): 12(832).

Other collections: above Khurmall, *Hadač* 5039 (BUH, PR); Dar Mazala, *Hadač et al.* 5088 (BUH, PR); Ballkha, *Rawi* 22380 (BAG, K); near Tawella, *Rechinger* 10165a (BUH, W).

508. *Euphorbia helioscopia* L.

(* , A, F, Fl, M, I, S, T): 11(189), 11(641), 11(777), 11(961).

509. *Euphorbia macrocarpa* Boiss. & Buhse

(* , P, F, Fl, Fr, M, I, T): 11(118), 11(433), 11(496), 12(432).

510. *Euphorbia macroclada* Boiss.

(P, F, Fl, Fr, M, I, S, T): 11(324), 11(1196), 11(1265), 12(1281).

Other collections: Hawara Barza Mt., *Rawi et al.* 29502 (BAG, K); near Tawella, *Rechinger* 10269 (BUH, W); *Tawella, Rawi* 21943 (BAG, K).

511. *Euphorbia microsphaera* Boiss.

(A, F, Fl, Fr, M, I, S, T): 11(1166), 12(1206).

Other collections: Shaikh Sadik, *Haines* 2088 (BUH, K).

512. *Euphorbia petiolata* Banks & Sol.

Other collections: between Saiyid Sadiq and Halabja, *Karim* 39312 (BAG, K).

513. *Euphorbia phymatosperma* Boiss. & Gaill.

(* , A, Vr, Fr, M, I, S): 11(374), 12(342).

514. *Euphorbia szovitsii* Fisch. & C.A.Mey.(Fig. 5-55: 2)

(A, F, Fl, Fr, M, I, S, T): 11(655), 11(849), 11(1043),

11(1209), 12(879), 13(2).

Other collection: N of Halabja, *Rawi* 22076 (BAG, K); 2 km E Halabja, *Rawi* 21821 (BAG, K); Naragora, 2 km NE Ballkha, *Rawi et al.* 29550 (BAG, K); Halabja, *Rechinger* 10129 (BUH, W); 10 km W Tawella, *Rawi* 22118 (BAG, K); Susakan, *Rechingewr* 10188 (BUH, W).



Figure 5-54: 1. *Euphorbia denticulata* Lam. – 2. *Euphorbia szovitsii* Fisch. & C.A.Mey.

515. *Euphorbia* sp.

(A, R, F): 12(71).

39. Family FABACEAE (LEGUMINOSAE)

This family is represented in Hawraman by 23 genera and 100 species, of which 37 are new to Hawraman.

516. *Alhagi camelorum* Fisch.

(* , P, C, Fl, M, I, S, T): 12(1174).

517. *Astragalus aegobromus* Boiss. & Hoh.

Other collections: Hawraman, *Rawi et al.* 19798 (BAG, K); above Daramar, *Gillett 11857* (BAG, K); Tawella, *Rawi and Rechinger 21979* (BAG, K).

Townsend (1974) listed the above collections from Hawramn under var. *hirsutus* Boiss. However, Podlech (1999) reduced that variety to synonymy of the species and did not cite any locality in Sulaimani Province, including Harwraman.

518. *Astragalus brachystachys* DC.

Other collections: near Tawella, *Rechinger 10222* (BUH, W).

519. *Astragalus campylorrhynchus* Fisch. & C.A.Mey.

(* , A, O, Fl, M, I, S, T): 11(424), 12(78), 12(142).

520. *Astragalus carduchorum* Boiss. & Hausskn.

Other collections: Hawraman, *Rawi and Serhang 23959A* (BAG, K).

The type collection of this species, *Haussknecht 334* (lectotype, G-BOIS; isolectotypes, G-BOIS, G, JE, KE, P, W) was cited from Hawraman Iraq in Zarre et al. (2008) but was not listed in Townsend (in 1974). The species is endemic to Kurdistan of Iraq and Iran and is known from about 15 collections.

521. *Astragalus caryolobus* Bunge.

(* , P, R, Fl, M, I): 12(350).

Although this species is endemic to Kurdistan Iraq and Iran, it was not previously collected from Hawraman.

522. *Astragalus cephalotes* Banks & Sol.

(* , P, R, Fl, M, S, T): 11(1018).

The species is widespread in Kurdistan Iraq, but the doubtful collection of Haussknecht that Townsend (1974) listed from Hawaramn was very likely collected from Iran because Zarre et al. (2008) did not list it from Iraq.

523. *Astragalus compactus* Lam.

(P, Vr, Fl, M): 11(891), 12(1260), 12(1323).

Other collections: Susakan, *Rechinger 10149* (BUH, W); 7 km W of Tawella, *Rawi and Serhang 22365* (BAG, K); Tawella, *Rawi 21948* (BAG, K).

Townsend (1974) used the name *Astragalus strictifolius* Boiss. for the species and listed it from Hawraman. However, according to Zarre et al. (2008), the correct name for the species is *A. compactus* published in 1783. The species is quite widespread in Iran, Turkey, and the Caucasus.

524. *Astragalus echinops* Boiss. (Fig. 5-56).

(* , P, Vr, Fl, M, I, T): 12(1263).



Figure 5-55: *Astragalus echinops* Boiss. 1. Habit. – 2. Leaves. – 3. Head – 4. Flowers

525. *Astragauls globiflorus* Boiss.

Other collections: Hawraman, *Rawi et al.* 9794 (BAG, K).

The species was collected only once from Hawraman. It is endemic to Kurdistan Iraq and Iran.

526. *Astragalus gossypinus* Fisch.

(P, F, Fl, M, I, S, T): 11(1267), 12(1222), 12(1293),
12(1567).

The species was doubtfully listed by Townsend (1974) from Hawraman Iraq, but the collection on which that record was based, Haussknecht s.n. (JE), was cited by Zarre et al. (2008) as occurring in Kurdistan Iran.

527. *Astragalus gudrunensis* Boiss. & Hausskn.

(P, F, Fl, Fr, M, I): 11(615), 11(981), 12(333), 12(529),
12(1081).

Other collections: Tawella, *Rawi and Rechinger* 22298 (BAG, K),
Rechinger 10339 (BUH, W); Ballkha, 7 km W of Tawella, *Rawi and*
Rechinger 22328 (BAG, K).

This species is endemic to Kurdistan Iraq and Iran.

528. *Astragauls hamosus* L.

(* , A, F, Fr, M, I, S, T): 11(284), 11(467).

529. *Astragalus kurrindicus* Boiss.

(* , P, Vr, Fl, Fr, M, I): 12(1438).

530. *Astragalus lagurus* Willd.

(P, R, Fl, M, I, T): 12(510).

Townsend (in Townsend et al., 1974) cited collections of this species from Pirmagrün, Azmir, Gwajja, and a doubtful record from Hawraman collected by Haussknecht possibly from Shahu, Iran. The presence of the species in Hawraman is confirmed herein.

531. *Astragalus michauxianus* Boiss.

(P, F, Fl, Fr, M, I): 11(508), 11(103), 11(1220), 11(1508),
11(1550), 12(387), 12(645), 12(1294).

Other collections: near Tawella, *Rechinger* 10343 (BUH, W); N of Halabja, *Rawi and Rechinger* 22092 (BAG, K); Kamarspa, *Rawi and*
Rechinger 22231 (BAG, K).

532. *Astragauls micrancistrus* Boiss. & Hausskn.

(* , P, F, Fl, Fr, M, I, T): 11(1468), 12(402), 12(809),
12 (941).

533. *Astragalus microcephalus* Willd.

(P, C, Fl, M, I, T): 11(1503), 12(497), 12(1296), 12(1426),
12 (1499).

Other collections: Hawraman, *Rawi et al. 19793* (BAG, K).

The species was not recorded from Hawraman Iraq in Flora Iranica (Zarre et al., 2008).

534. *Astragalus octopus* C.C.Towns.

Other collections: Kamarspa, *Rawi and Rechinger 22256* (holotype, K; isotype, BAG); Tawella, *Rechinger 10345* (BUH, W); above Tawella, *Rechinger 10379* (BUH, W).

The species is endemic to Hawraman of both Iraq and Iran, and it is known from Iran from a handful specimens collected from Marivan and 90–130 km W of Sanandaj.

535. *Astragalus oleifolius* DC.

(* , P, R, Fl, M, S, T): 11(1335), 12(614), 12(1075).

536. *Astragalus ovinus* Boiss.

Other collections: above Daramar *Gillett 11857* (BAG, K); Tawella, *Rawi and Rechinger 21979* (BAG, K), *Rechinger 10352* (BUH, W); Kamarspa, *Rawi and Rechinger 22186* (BAG, K).

The species was not listed by Townsend (1974) from Iraq but instead he listed *A. lobophorus* Boiss. However, Podlech (1999) cited

more than 20 collections from Kurdistan Iraq, including several from Hawraman, and treated the two names as conspecific.

537. *Astragalus prusianus* Boiss.

(* , P, R, Fl, M, T): 11(1551), 12(1024), 12(1272).

This species is extremely rare in Kurdistan Iraq, where it was collected once from Zawita.

538. *Astragalus rawianus* C.C.Towns.

(* , P, R, Fl, M, I):11(1226), 12(334), 12(632), 12(493),
12(1292).

539. *Astragalus rhodochorus* Boiss. & Hausskn.

(P, F, Fl, M, I): 11(1612).

540. *Astragalus sarae* Eig

(* , P, O, Fl, M): 11(1629), 12(33).

This species endemic to Kurdistan Iraq.

541. *Astragalus stenostegius* Boiss. & Hausskn.

This species was collected by Haussknecht between Hawraman and Shahu, which is likely from Kurdistan Iran, as the other known four collections of the species. Townsend (1974) recognized this species and *A. spinellus* Boiss. & Hausskn. as distinct, but Podlech et al. (2001) reduced the latter to synonymy of *A. stenostegius*.

542. *Astragalus tawilicus* C.C.Towns. (Fig. 5-57)

(P, Vr, Fl, Fr, I): 13(85)



Figure 5-56: *Astragalus tawilicus* C.C.Towns. 1. Habit. – 2. Leaves. – 3. Flowers

Other collections: near Tawella, *Rechinger 12369* (BUH, W), *Rawi and Rechinger 2284* (BAG, K).

The species is endemic to Hawraman in Kurdistan Iraq and eastward into Kurdistan Iran northward to Azerbaijan Province in Iran.

543. *Astragalus tortuosus* DC. (Fig. 5-58)

(P, O, Fl, M, I, T): 11(1570), 12(1156), 12(1377).



Figure 5-57: *Astragalus tortuosus* DC. 1. Habit. – 2. Leaves. – 3. Fruits. – 4. Seed

Other collections: near Tawella, *Rechinger 10364* (BUH, W); N of Halabja, *Rawi and Rechinger 22066* (BAG, K).

544. *Astragalus* sp.1

(P, Vr, Fl): 12(504).

545. *Astragalus* sp.2

(A, R, Fl, M, I, S, T): 12(100).

Notes: Townsend (1974) listed *Astragalus adsendens* Boiss. & Hausskn. as a species doubtfully growing in Hawraman. However, Zarre et al. (2008) reduced it to synonymy of *A. brachycalyx* Fisch., a species reported by Townsend from other parts of Kurdistan Iraq but not from Hawraman. Townsend also reported *A. rhodochorous* Boiss. & Hausskn. and *A. leucoptilus* Boiss. & Hausskn. as doubtfully occurring in Hawraman Iraq, but the collections on which these two records were based, *Haussknecht* 354 and 35 (both at JE), respectively, were listed by Zarre et al. (2008) from Kurdistan Iran. The same can be said for *A. lateritius* Boiss. & Hausskn. and *A. piptocephalus* Boiss. & Hausskn., two species not known to grow outside Kurdistan Iran, though doubtfully reported by Townsend (1974) from Iraq.

Although Townsend (1974) listed *Astragalus lagurus* Willd. as doubtfully occurring in Hawraman Iraq, that name was reduced to synonymy of *A. lagopoides* Lam., a species not listed for Iraq by Podlech et al. (2001).

546. *Cercis siliquastrum* L.

(* , P, Fr, M, I, S, T): 11(1434).

547. *Cicer anatolicum* Alef.

Other collections: above Darimarr, Gillett 11894 (BAG, K).

548. *Cicer arietinum* L.

(A, F, Fr, I, S, T): 11(416), 12(831).

A cultivated species that also grows wild in Kurdistan.

549. *Coronilla scorpioides* (L.) W.D.J.Koch

(A, F, Fr, M, I, S, T): 11(813), 11(482), 12(113), 13(281).

Other collections: near Tawella, *Rechinger 12383* (BUH, W); Khurmall, *Rawi 8966E* (BAG, K); Tawella, *Rawi 21899* (BAG, K).

550. *Coronilla varia* L.

(P, F, Fl, Fr, M, I, S, T): 11(1364).

Other collections: near Tawella, *Rechinger 12382* (BUH, W).

551. *Gleditsia triacanthos* L.

(* , P, Fr, O, M, I, S, T): 12(1555).

552. *Glycyrrhiza glabra* L.

(* , P, C, Fl, I, S, T): 12(466), 12(1180).

553. *Hippocrepis unisiliquosa* L.

(* , A, F, Fr, M, I, S, T): 11(481), 12(324).

554. *Hymenocarpus circinnatus* (L.) Savi

(A, F, Fl, Fr, M, I, S, T): 11(460), 12(146), 12(246).

Other collections: Khurmall, *Rawi 8855* (BAG, K), 10 km W of Tawella, *Rawi 22137* (BAG, K); near Tawella, *Rechinger 12397* (BUH, W).

555. *Lathyrus annuus* L.

(* , A, R, Fl, Fr, I, T): 11(319), 12(15), 12(221).

556. *Lathyrus aphaca* L.

(* , A, O, Fl, M, I, T): 12(161), 12(551).

557. *Lathyrus cicera* L.

(A, O, Fl, M, I): 11(110).

Other collections: above Tawella, *Rechinger 12403b* (BUH, W).

558. *Lathyrus sphaericus* Retz.

Other collections: near Tawella, *Rechinger 12403a* (BUH, W).

559. *Lathyrus vinealis* Boiss. & Noë.

(A, F, Fl, M): 11(110), 11(846), 12(114), 12(597).

Other collections: near Tawella, *Rechinger 12403a* (BUH, W).

560. *Lens culinare* Medik.

(A, F, Fl, M, I, S, T): 11(355), 11(922), 11(955), 12(322), 13(33).

Other collections: N of Biyara, *Gillett 11779* (BAG, K); near Tawella, *Rechinger 12388* (BUH, W).

561. *Lens orientalis* (Boiss.) Hand.-Mazz.

(A, F, Fl, Fr, I, S, T): 11(163), 11(845), 12(376).

Other collections: 10 km W of Tawella, *Rawi 22183* (BAG, K); Susakan, 5 km S of Tawella, *Rawi 21834* (BAG, K), Tawella, *Rawi 21884* (BAG, K); near Tawella, *Rechinger 10226b* (BUH, W).

562. *Lotus aegeus* (Griseb.) Boiss.

(* , P, R, Fl, M, T): 11(893), 12(638), 12(874).

563. *Lotus corniculatus* L.

(* , P, R, Fl, M, I, S, T): 12(1136), 13(123).

564. *Lotus gebelia* Vent. var. *gebelia*

(P, F, Fl, M, I, S, T): 11(804), 11(964), 12(605), 12(1027).

Other collections: Hawraman N of Halabja, *Rawi* 22059 (BAG, K), Ballkha, *Rawi* 22329 (BAG, K); Susakan, *Rawi* 21837 (BAG, K); near Tawella, *Rechinger* 10202, 10207 (BUH, W).

565. *Lotus gebelia* Vent. var. *villosus* Boiss.

Other collections: near Tawella, *Rechinger* 10297b (BUH, W); N of Biyara, *Gillett* 11759 (BAG, K).

The main difference between this and the preceding variety is that plants of var. *villosus* are pilose vs. glabrous.

566. *Medicago constricta* Durieu

Other collections: 10 km W of Tawella, *Rawi* 22129 (BAG, K).

567. *Medicago cornuta* (L.) Bartal.

(* , A, F, Fr, M, I, S, T): 11(289).

568. *Medicago laciniata* (L.) Mill.

(* , A, F, Fr, M, I, T): 11(312), 12(138), 12(325).

569. *Medicago minima* (L.) Bartal.

Other collections: near Tawella, *Rechinger* 12408 (BUH, W).

570. *Medicago orbicularis* (L.) Bartal.

(A, F, Fr, M, I, S, T): 11(29), 11(478), 12(141).

Other collections: near Tawella, *Rechinger* 12409 (BUH, W).

571. *Medicago polymorpha* L.

Other collections: Hawraman, *Rawi et al.* 29387 (BAG, K); Halabja, *Rawi* 8875 (BAG, K).

572. *Medicago radiata* L.

(A, F, Fr, M, I, T): 11(559), 12(598).

Other collections: Balka, 7 km W of Tawella, *Rawi* 22382 (BAG, K), Tawella, *Rawi* 21923 (BAG, K), *Rechinger* 12411 (BUH, W).

573. *Medicago rigidula* (L.) All.

(A, R, Fr, M, I, S, T): 12(571), 12(595).

Other collections: near Tawella, *Rechinger* 12410 (BUH, W).

574. *Medicago sativa* L.

(P, F, Fl, Fr, M, I, S, T): 11(1544), 12(939), 12(1099), 12(1190).

Other collections: Zallm, *Rawi et al.* 29387 (BAG, K).

Also cultivated for animal feed.

575. *Medicago turbinata* L.

(* , Vr, Fr, M, I, S, T): 11(448).

576. *Onobrychis caput-galli* (L.) Lam.

(* , A, F, Fr, M, I, S, T): 11(561), 11(780).

577. *Onobrychis crista-galli* (L.) Lam.

(* , A, F, Fr, M, I, S, T): 12(38), 12(94), 12(144), 12(242).

578. *Onobrychis schahuensis* Bornm. (Fig. 5-59)

(* , P, R, Fr, M, I): 11(906), 13(98).



Figure 5-58: *Onobrychis schahuensis* Bornm. 1. Habit. – 2. Fruits. – 3. Inflorescence

579. *Ononis biflora* Desf.

(* , A, O, Fl, M, I, S, T): 11(300), 11(423), 12(136), 12(193).

580. *Ononis spinosa* L.

(P, F, Fl, M, I, S, T): 11(1056), 11(1151), 12(1181).

Other collections: Hawraman, *Rawi et al. 19838* (BAG, K).

581. *Pisum sativum* L.

(A, C, Fl, Fr, M, I, S, T): 11(107), 11(358), 11(688),

11(795), 11(1059), 12(581), 12(582), 13(44).

Other collections: near Tawella, *Rechinger 10292* (BUH, W); Halabja, *Rawi 8870, 8966G* (BAG, K).

This is a highly variable species in Southwest Asia and is cultivated worldwide for its young fruits and dried seeds. It has been divided into several subspecies and varieties, of which vars. *elatius* (M.Bieb.) Aschers. & Graebn. (flowers 15–18 mm long; leaves with 1–3 leaflet pairs) and *pumilo* Meikle (flowers 20–30 mm long; leaves with 2–4 leaflet pairs)

were recognized. Because of the artificiality of these differences, no attempts were made to assign the above-listed collections to varieties.

582. *Prosopis farcta* (Banks & Sol.) J.F.Macbr.

(* , P, C, Fl, M, I, S, T): 12(1174).

583. *Robinia pseudacacia* L.

(* , R, Fr, I, S, T): 121554).

584. *Scorpiurus muricatus* L.

(* , A, F, Fl, Fr, M, I, S, T): 11(390), 11(441), 12(13),
12(240).

585. *Securigera securidaca* (L.) Degen & Doerfl.

(A, F, Fl, Fr, M, I, T): 11(35), 11(314), 11(414), 12(1187).

Other collections: Susakan, *Rechinger 10164* (BUH, W); Khurmall, *Rawi 8943* (BAG, K); Halabja, *Rawi 8868* (BAG, K); Biyara, *Gillett 11741* (BAG, K); Ballkha, *Rawi 22350* (BAG, K).

586. *Trifolium arvense* L.

Other collections: Tawella, *Rawi and Rechinger 21952* (BAG, K), *Rechinger 10219* (BUH, W); N of Biyara, *Gillett 11755* (BAG, K).

587. *Trifolium campestre* Schreb.

(A, F, Fl, M, I, S, T): 11(204), 11(275).

Other collections: near Tawella, *Rechinger 10218* (BUH, W); 7 km W of Tawella, *Rawi 22379* (BAG, K).

588. *Trifolium cherleri* L.

(* , R, Fl, M, I): 11(669), 12(233).

589. *Trifolium echinatum* M.Bieb.

Other collections: Khurmall, *Hadač 5068* (BUH, PR).

590. *Trifolium fragiferum* L.

(* , P, Vr, Fl, M, I, T): 12(209).

591. *Trifolium grandiflorum* Schreb.

(A, Vr, Fl, M, I, S, T): 11(732).

Other collections: N of Biyara, *Gillett 11766* (BAG, K); near Tawella, *Rechinger 10217* (BUH, W).

592. *Trifolium hirtum* All.

Other collections: Halabja, *Rawi 8872* (BAG, K); N of Biyara *Gillett 11767* (BAG, K); near Tawella, *Rechinger 12434* (BUH, W).

593. *Trifolium nigrescens* Viv.

Other collections: Halabja, *Rawi 8966* (BAG, K).

594. *Trifolium pilulare* Boiss.

Other collections: near Tawella, *Rechinger 10287* (BUH, W); Khurmall, *Rawi 8966J* (BAG, K); N of Biyara, *Gillett 17781* (BAG, K); 7 km W of Tawella, *Rawi 22383* (BAG, K).

595. *Trifolium purpureum* Loisel.

(A, C, Fl, Fr, M, I, S, T): 12(361), 12(451), 12(611), 13(19).

Other collections: above Khurmall, *Hadač 5069* (BUH, PR); N of Biyara, *Gillett 11758* (BAG, K); near Tawella, *Rechinger 12448* (BUH, W).

596. *Trifolium repens* L.

Other collections: Biyara, *Gillett 11736* (BAG, K).

597. *Trifolium resupinatum* L.

(A, F, Fl, M, I, S, T): 11(430), 11(690), 12(224).

Other collections: Khurmall, *Rawi 8882* (BAG, K); near Tawella, *Rechinger 12431* (BUH, W).

598. *Trifolium scabrum* L.

Other collections: N of Biyara, *Gillett 11765* (BAG, K); near Tawella, *Rechinger 12433* (BUH, W).

599. *Trifolium spumosum* L.

Other collections: Kani Spi, *Rawi 22413* (BAG, K); Khurmall, *Rawi 8890* (BAG, K).

600. *Trifolium stellatum* L.

(A, F, Fl, Fr, M, I, S, T): 11(458), 11(982).

Other collections: Halabja, *Rawi 8877* (BAG, K).

601. *Trifolium sylvaticum* Gerard ex Loisel.

Other collections: Tawella, *Rechinger 12432* (BUH, W).

602. *Trifolium tomentosum* L.

(* , A, O, Fr, M, I, T): 11(464).

603. *Trigonella filipes* Boiss.

Other collections: Khurmall, *Rawi 8858* (BAG, K); near Tawella, *Rechinger 12436* (BUH, W).

604. *Trigonella monantha* C.A.Mey. subsp. *monantha*

(A, F, Fr, M, I, T): 11(871), 11(935).

Other collections: Ballkha, 7 km W of Tawella, *Rawi* 22381 (BAG, K).

605. *Trigonella monantha* subsp. *noeana* (Boiss.) Huber-Morath

(A, F, Fr, M, I, T): 12(323), 12(602).

Other collections: Susakan, *Rechinger* 10168 (BUH, W).

606. *Trigonella monspeliaca* L.

Other collections: near Tawella, *Rechinger* 12435 (BUH, W); 10 km W of Tawella, *Rawi* 22153 (BAG, K).

607. *Trigonella strangulata* Boiss.

(* , A, F, Fl, Fr, M, I, T): 11(82), 11(205), 11(558), 11(797).

608. *Trigonella uncata* Boiss. & Noë

(* , A, F, Fl, M, I, T): 11(412), 11(651), 11(680), 12(65).

609. *Vicia ervilia* (L.) Willd.

(* , A, F, Fl, Fr, M, I, S, T): 11(628), 11(814), 12(124), 12(280), 12(319), 12(360), 11(426), 12(572).

610. *Vicia faba* L.

Cultivated throughout Kurdistan.

611. *Vicia hybrida* L.

(* , A, Vr, Fl, Fr, M, I, S, T): 12(12), 12(97), 12(220).

612. *Vicia michauxii* Spreng.

(A, R, Fl, Fr, M, I, S, T): 11(792), 11(929).

Other collections: Khurmall, *Rawi 8844* (BAG, K).

613. *Vicia narbonensis* L. (Fig. 5-60: 1)

(* , A, F, Fl, Fr, M, I, S, T): 11(321), 11(698), 12(30), 12(214), 12(590).

614. *Vicia palestina* Boiss.

(* , A, Vr, Fl, Fr, M, S, T): 11(262), 11(282).

615. *Vicia peregrina* L.

(A, R, Fl, Fr, M, S, T): 11(778).

Other collections: near Tawella, *Rechinger 12404* (BUH, W).

616. *Vicia sativa* L.

(A, C, Fl, Fr, M, I, S, T): 11(390), 11(673), 11(705), 12(24), 12(41), 12(128).

Other collections: near Tawella, *Rechinger 12440* (BUH, W); Halabja, *Rawi 8869* (BAG, K).

617. *Vicia tenuifolia* Roth (Fig. 5-60: 2)

(P, C, Fl, Fr, M): 11(391), 11(840), 11(1192), 11(1203), 12(1012).

Other collections: N of Halabja, *Rawi 22061* (BAG, K); N of Biyara, *Gillett 11827* (BAG, K); Tawella, *Rawi 21974* (BAG, K).



Figure 5-59: 1. *Vicia narbonensis* L. – 2. *Vicia tenuifolia* Roth.

618. *Vicia variabilis* Freyn & Sint.

Other collections: near Tawella, *Rechinger 10247* (BUH, W).

The species was recorded for Iraq in Flora Iranica but not Flora of Iraq.

40. Family FAGACEAE

This family is represented in Hawraman by one genus and five species, of which two are new to Hawraman.

619. *Quercus aegilops* L. (Fig. 5-61: 1).

(P, C, Fl, Fr, M, I, S, T): 11(386), 11(722), 11(1230), 11(1439), 11(1540), 12(564), 12(651), 12(695), 12(707), 12(1023).

Other collections: Halabja, *Rawi 8866* (BAG, K); 8 km N of Kani Spi, *Rawi 22415* (BAG, K).

620. *Quercus brantii* Lindl.

Other collections: Susakan, *Rechinger 10171* (BUH, W); Kani Spi, *Rechinger 10388* (BUH, W).

621. *Quercus infectoria* Oliv. (Fig. 5-61: 2)

(* , P, C, Fl, M, I, S, T): 11(1189), 12(1265), 12(1570).



Figure 5-60: 1. *Quercus aegilops* L. – 2. Leaves. – 3. Fruits; 4. *Quercus infectoria* Oliv. – 5. Leaves. – 6. Fruits

622. *Quercus libani* Oliv.

(* , P, O, Fl, M, I, S, T): 11(721), 11(1443), 12(800), 12(1443).

623. *Quercus* 1 (perhaps a hybrid).

(P, Vr, V): 11(1475).

41. Family GENTIANACEAE

This family is represented in Hawraman by two genera and three species, of which two are new to Hawraman and one new to Iraq.

624. *Centaurium meyeri* (Bunge) Druce (Fig. 5-62)

(**, A, Vr, Fl, I): 11(1162).

Glabrous annual. Stems 20–30 cm tall, branched from above. Cauline leaves oblong to lanceolate or elliptic, increasing in length upwards. Inflorescence with divaricate branches, often lax. Flowers 13–7 mm, corolla white, lobes 3·5–4 mm.

This is a very rare species in Hawraman; there is one small population with few individuals near Zallm river growing in wet places among grassland.



Figure 5-61: *Centaurium meyeri* (Bunge) Druce. 1. Habit. – 2. Leaves. – 3. Flowers

625. *Centaurium pulchellum* (Swartz) Druce

(* , A, R, Fl, M, I, S, T): 11(1163).

626. *Gentiana olivieri* Griseb.

(P, O, Fl, M, I, T): 11(902), 12(315), 12(766), 12(1049).

Other collections: Tawella, *Rawi* 21957 (BAG, K), *Rechinger* 10225 (BUH, W).

42. Family GERANIACEAE

This family is represented in Hawraman by two genera and nine species, of which two are new to Hawraman.

627. *Geranium dissectum* L.

(A, O, Fl, Fr, M, I, T): 11(218), 11(404), 12(149).

Other collections: Halabja, *Barkley* 7538 (BUA, W).

628. *Geranium lucidum* L.

(* , A, F, Fl, Fr, M, I, S, T): 11(190), 11(256), 11(451).

629. *Geranium persicum* Schoenbeck-Temesy

(P, F, Fl, Fr, M, I, T): 11(122), 11(1359).

Other collections: near Tawella, *Rechinger 12393* (BUH, W)

630. *Geranium purpureum* Vill.

(* , A, O, Fl, Fr, I, S, T): 11(708), 11(1095).

631. *Geranium rotundifolium* L.

(A, F, Fl, Fr, M, I, S, T): 11(272), 11(1093), 12(216).

Other collections: Susakan, *Rechinger 10183* (BUH, W).

632. *Geranium tuberosum* L.

(* , P, C, Fl, M, I, S, T): 11(46), 11(339), 11(548).

633. *Geranium* sp.1

(A, F, Fl): 11(32).

634. *Erodium cicutarium* (L.) L'Her. ex Aiton

(A, C, Fl, Fr, M, I, S, T): 11(4), 11(216), 11(357), 11(472), 12(11), 12(109), 12(583), 12(881).

Other collections: Susakan, *Rechinger 10147* (BUH, W).

635. *Erodium moschatum* (L.) L'Her. ex Aiton

(A, R, Fr): 12(828).

636. *Erodium oxyrhynchum* M.Bieb.

(* , B, Vr, Fl, Fr, M, I, T): 11(1137).

43. Family HYPERICACEAE

This family is represented in Hawraman by one genus and six species (one with two varieties), of which two taxa are new to Hawraman.

637. *Hypericum lydiium* Boiss.

(* , P, Vr, Fr, M, T): 11(1556).

This is the first record of the species for Sulaimani Province

638. *Hypericum lysimachioides* Boiss. & Noë var. *lysimachioides*

(* , P, F, Fl, Fr, M, I, T): 11(882), 11(1188), 11(1207), 12(391),

12(773), 12(1096), 12(1307).

639. *Hypericum lysimachioides* Boiss. & Noe var. *spathulatum*
N.Robson

(P, R, Fl, M, S, T): 12(993).

Other collections: Kamarspa, *Rawi* 22188 (BAG, K); Tawella, *Rechinger* 10376 (BUH, W).

640. *Hypericum perforatum* L.

(P, F, F, Fr, M, I, S, T): 11(788), 11(1083), 11(1300), 12(1165),

12(1200).

641. *Hypericum scabrum* L.

(P, C, Fl, Fr, M, I, S, T): 11(838), 11(894), 11(933), 11(1323),

12(381), 12(622), 12(789), 12(1287), 12(1484).

Other collections: Hawara Barza Mt., *Rawi et al.* 29501 (BAG, K); Malla Khort Mt., *Rawi et al.* 29538 (BAG, K); N of Biyara, *Gillett* 11808 (BAG, K); Susakan, *Rawi* 21828 (BAG, K); Dara Tri, *Rawi* 22019 (BAG, K); Kamarspa, *Rawi* 22236 (BAG, K); Tawella, *Rawi* 22282 (BAG, K), *Rechinger* 10367 (BUH, W).

642. *Hypericum triquetrifolium* Turra

(* , P, F, Fl, M, I, S, T): 12(1275), 12(1463).

643. *Hypericum vermiculare* Boiss. & Hausskn.

(P, R, Fl, M, I): 12(942).

Other collections: Tawella, *Rawi* 21926 (BAG, K), *Rechinger* 10312 (BUH, W).

644. *Hypericum* sp.

(P, O, Fr): 11(1556).

44. Family IRIDACEAE

This family is represented in Hawraman by four genera and nine species, of which six are new to Hawraman.

645. *Crocus cancellatus* Herb. subsp. *damascenus* (Herb.) Mathew.

(* , O, Fl, M, I, S, T): 12(1635).

646. *Gladiolus atroviolaceus* Boiss.

(* , P, R, Fl, M, I, S, T): 12(260).

647. *Gladiolus italicus* Mill.

(P, F, Fl, Fr, M, I, S, T): 11(245), 11(740), 11(879), 11(1103).

Other collections: Tawella, *Rechinger 10221* (BUH, W).

648. *Gynandrisis sisyrinchium* L.

(* , F, Fl, Fr, M, I, S, T): 11(19), 11(166), 11(244), 12(99), 12(172).

649. *Iris aucheri* (Bak.) Sealy

(P, F, Fl, Fr, M, I, S, T): 11(92), 11(529).

Other collections: above Darimarr, *Gillett, 11879* (BAG, K).

650. *Iris germanica* L.

(P, F, Fl, M, I): 11(270), 11(715).

Other collections: near Tawella, *Rechinger 12398* (BUH, W); Tawella, *Rawi et al. 29533* (BAG, K).

651. *Iris persica* L.

(* , O, Fl, M, I, S, T): 13(1).

652. *Iris postii* Mouterde

(* , P, F, Fr, M, S): 11(395), 12(270), 12(312), 12(563).

653. *Iris reticulata* M.Bieb. (Fig. 5-63)

(* , P, C, Fl, Fr, M, I, T): 11(119), 11(170), 11(592), 12(2).



Figure 5-62: *Iris reticulata* M.Bieb. 1. Habit. – 2. Bulbs. – 3. Flower

45. Family IXIOLIRIONACEAE

This family is represented in Hawraman by one genus and one species first recorded herein for the Mountain.

654. *Ixiolirion tataricum* (Pall.) J.A. & J.H.Schultes (Fig. 5-64).

(* , P, F, Fl, Fr, M, I, S, T): 11(336), 11(497), 11(966), 12(501), 13(80).



Figure 5-63: : *Ixiolirion tataricum* (Pall.) J.A. & J.H.Schultes 1. Habit. – 2. Bulb. – 3. Flowers

46. Family JUGLANDACEAE

This family is represented in Hawraman by one genus and one species not previously reported for the mountain.

655. *Juglans regia* L.

(* , P, C, Fr, M, I, S, T): 11(812), 13(82).

47. Family JUNCACEAE

This family is represented in Hawraman by one genus and three species, of which one is new to Hawraman.

656. *Juncus articulatus* L.

(A, F, Fl, Fr, M, I, S, T): 11(1147), 11(1351), 12(1596).

Other collections: Tawella, *Rawi* 21983 (BAG, K); near Tawella, *Rechinger* 10289 (BUH, W).

657. *Juncus bufonius* L.

(* , A, O, Fl, M, I, T): 11(682).

658. *Juncus inflexus* L.

(P, F, Fl, Fr, M, I, S, T): 11(1150), 11(1425), 11(1570),

12(81), 12(1183).

Other collections: 10 km W Halabja, *Barkley* 7551 (BUA, K); Hawraman range, *Rawi et. al.* 19799 (BAG, K).

48. Family LAMIACEAE (LABIATAE)

This family is represented in Hawraman by 24 genera and 67 taxa, of which 18 are new to Hawraman and two to Iraq.

659. *Ajuga chamaepitys* (L.) Schreb.

(* , P, Vr, Fl, M, I): 11(254).

660. *Clinopodium vulgare* L. subsp. *orientale* Bothmer

(P, F, Fl, Fr, M, I, T): 11(1272), 11(1517).

Other collections: near Tawella, *Rechinger 12377* (BUH, W).

661. *Eremostachys laevigata* Bunge

(P, F, Fl, Fr, M, I): 11(562), 11(945), 11(969), 12(989).

Other collections: near Tawella, *Rechinger 12387* (BUH, W).

662. *Eremostachys macrophylla* Montbr. & Auch. (Fig. 5-65)

(P, Vr, Fl, M, I, T): 12(499).

Other collections: near Tawella, *Rechinger 10238* (BUH, W).



Figure 5-64: *Eremostachys macrophylla* Montbr. & Auch. 1. Habit. – 2. Basal leaf. – 3. Branches. – 4. Flower

663. *Hymenocrater longiflorus* Benth. (Fig. 5-66)

(P, F, Fl, Fr, M, I): 11(1014), 11(1249), 12(659), 12(718), 12(933)
12(985), 12(1150).



Figure 5-65: *Hymenocrater longiflorus* Benth.

Other collections: near Tawella, *Rechinger 10374* (BUH, W).

664. *Lagochilus kotschyanus* Boiss. (Fig. 5-67)

(* , P, Vr, Fl, M, I): 12(1137), 12(1534).

This species is very rare to Kurdistan Iraq, where it grows in a restricted area in the subalpine zone at 2300 m in Dalane Mt. above Ahmad Awa, and it comprises a very small population of about ten 10 plants.



Figure 5-66: *Lagochilus kotschyanus* Boiss. 1. Habit. – 2. Branches. – 3. Leaves. – 4. Flower

665. *Lallemantia iberica* (Stev.) Fisch. & C.A.Mey.

(* , A, O, Fl, Fr, M, I, T): 11(569), 11(970), 11(1034), 12(413), 12(425), 13(63).

666. *Lallemantia peltata* (L.) Fisch. & C.A.Mey.

(A, F, Fl, Fr, M, I, T): 11(609), 11(962), 12(619), 12(743), 12(950),
12(1080).

Other collections: near Tawella, *Rechinger 10328* (BUH, W).

667. *Lamium amplexicaule* L.

(* , A, F, Fl, M, I, S, T): 11(75), 11(89), 11(366), 11(582), 12(596).

668. *Lamium garganicum* L.

(P, O, Fl, Fr, M, I, S, T): 12(745), 12(1348).

Other collections: Hawraman, *Gillett 11854* (BAG, K).

669. *Lycopus europaeus* L.

(* , P, Vr, Fl, M, I, T): 12(1598), 12(1618).

670. *Marrubium astracanicum* Jacq.

(P, F, Fl, Fr, M, I, T): 11(1030), 11(1605), 12(624), 12(768),
12(1109).

Other collections: Kamarspa, *Rawi 22207* (BAG, K); Mt. Hawara Berza, *Rawi et al. 29519* (BAG, K); near Tawella, *Rechinger 10248 a-b, 10344* (BUH, W).

671. *Marrubium cuneatum* Russell

(P, C, Fl, Fr, M, I, T): 11(869), 11(936), 11(1001), 11(1181),
11(1584), 12(380), 12(528), 12(924).

Other collections: N of Biyara, *Gillett 11764* (BAG, K); Malla Khort, *Rawi et al. 29478* (BAG, K); Zallm Mt., *Rawi et al. 29404* (BAG, K); Hawara Barza Mt., *Rawi et al. 29505* (BAG, K); Susakan, *Rechinger*

10139 (BUH, W); N of Biyara, *Gillett 11764* (BAG, K); near Tawella, *Rechinger 10245*, 110276 (BUH, W), *Rawi 21921* (BAG, K).

672. *Marrubium parviflorum* Fisch. & C.A.Mey.

(**, P, R, Fl, M, I, T): 12(1040).

Description: Perennial herbs, sometimes woody at base. Stems 20–55 cm high, simple or rarely branched below inflorescence, wooly, internodes to 6 cm long. Leaves narrowly elliptic, petiolate, obtuse, crenate, velutinous; petiole 1–1.2 cm; blade 2–4 × 1–1.5 cm. Verticillate cymes 10–20(–30)-flowered, ca. 1.8 cm in diam.; bracteoles subulate, subequal to calyx tube. Calyx tube 4–4.5 mm, subcampanulate, (5–)10-toothed, teeth patent, 2–3.5 mm, straight at apex, pilose; corolla white, 6–7 mm, galea 1.5–3.5 mm, 2-fid. Nutlet black, ellipsoid-trigonus, ca. 2.4 × 1.6 mm

This is the first record of the species from Iraq. The species is widespread in Iran, Turkey, and the Caucasus.

673. *Melissa officinalis* L.

(* , P, C, Fl, Fr, M, I, T): 11(1094), 12(1253).

674. *Mentha longifolia* (L.) Hudson

(* , P, C, Fl, M, I, T): 11(1405), 12(1315), 12(1451), 12(1572), 12(1601).

This is a highly variable species divided into seven varieties in the Flora Iranica area. These are exclusively based on minor differences in the indumentum and vegetative parts. One collection, 12(1315), differs from the others above by having white (vs. purple) flowers, and its plants grew in a dry mountain side (vs. along streams). Further studies are needed on this complex.

675. *Micromerea myrtifolia* Boiss. & Hohen.

(P, O, Fl, M, I, S, T): 12(852).

Other collections: Susakan, *Rechinger 10201* (BUH, W).

676. *Moluccella laevis* L.

(* , P, Fr, M, I, T): 11(1590).

677. *Nepeta cataria* L.

(P, Vr, Fl, M, I, T): 12(1327).

The species was collected once by Haussknecht in Hawraman and Shahu, but the exact locality is unknown and could easily be in Iran. However, the species was collected from Kurdistan Iraq near Dihok and Sharanish.

678. *Nepeta humilis* Benth.

(A, F, Fl, M, I): 11(417), 11(1051), 12(631).

Other collections: Hawara Berza, *Rawi et al. 29525* (BAG, K); near Tawella, *Rechinger 10338 a-b, 12414* (BUH, W).

679. *Nepeta macrosiphon* Boiss. (Fig. 5-68: 1).

(* , P, Vr, Fl, M, I, T): 12(1339).

A very rare species in Kurdistan Iraq, where it grows in a very restricted geographical area at 2000 m. It was collected once from Hawraman by Haussknecht but from the Iranian side and, therefore, the collection made in this study is the first from the Iraqi Hawraman.

680. *Nepeta nuda* L.

(** , P, F, Fl, Fr, M, I, T): 11(1208), 12(1085), 12(1299).

Description: Perennial, many-stemmed herbs. Stems 50–80 cm high, long branched above, subglabrous below, with short, basally thickened hairs elsewhere. Lower leaves with petioles to 1 cm; blade to 10 cm × 3.5 mm, oblong-ovate to elliptic or lanceolate, glaucous below and densely short pilose, glandular punctate, prominently veined, base truncate to subcordate, margin crenate or dentate; uppermost leaves bract-like, 2–2.5 mm, linear-subulate. Verticillate cymes numerous, lax, pedunculate, short pilose and sessile glandular; pedicels rather short. Calyx 4–5 mm, tubular, becoming ovoid in fruit, green to violet flushed; teeth 3/5 calyx-tube length, scarious margined; corolla of bisexual flowers 8–9 mm, pilose outside, lavender to white; corolla of female flowers 5–6 mm, nearly enclosed in calyx. Nutlets 1.5–2.2 × 1–1.2 mm, triangular, brown, smooth or distally sparsely tuberculate, comose at apex.

The above three collections represent the first record for Iraq. The species is distributed from central and SE Europe into SW Asia, including NW Iran.

681. *Nepeta pastoralis* Bornm.

(P, F, Fl, M, I, T): 12(530), 12(687).

682. *Nepeta petraea* Benth.

(P, Vr, Fl, M, I): 12(155).

Other collections: Hawraman, *Hausknecht s.n.* (JE).

The species is rare in Kurdiastan Iraq, where it was previously collected from Rost.

683. *Nepeta speciosa* Boiss. & Noë

The species grows in Kurdistan Iraq near Rawandoz south into Mandali. Hausknecht collected it from Hawraman and Shahu (Kurdistan Iran), and it is uncertain if he collected from the Iraqi side of the mountain, though its occurrence here is expected.

684. *Origanum vulgare* L.

The species was collected once by Haussknecht from Hawraman and Shahu, but that collection could easily be from Iran.

685. *Phlomis anisodonta* Boiss.

Collected once from Hawraman and Shahu by Haussknecht, but it is not known from which side of the border was it collected. However, the presence of the species in Piramagrun makes it very likely to be found in Iraqi Hawraman.

686. *Phlomis armeniaca* Willd. (Fig. 5-68: 2).

(* , P, F, Fl, M, T): 11(983), 11(1254), 12(1357), 12(1420), 12(1444), 12(1491), 12(1606).

The species was not listed as occurring in Iraq in the Flora Iranica or Flora of Turkey, though it is included in the unpublished Kew checklist for Iraq.

687. *Phlomis bruguieri* Desf.

(* , P, R, Fl, M, I, T): 11(268).

688. *Phlomis kurdica* Rech.f.

(P, R, Fl, M, I, S, T): 12(452).

Specimen examined: near Tawella, *Rechinger 10300a* (BUH, W).

Endemic to Kurdistan of Iraq, Iran, Syria, and Turkey.

689. *Phlomis lanceolata* Boiss. & Hohen.

Other collections: near Tawella, *Rechinger 10300c* (BUH, W).

690. *Phlomis olivieri* Benth.

(P, O, Fl, M, I): 12(538), 12(560).

Other collections: near Tawella, *Rechinger 10300b* (BUH, W).

691. *Phlomis rigida* Labill.

(* , P, O, Fr, M, I, S, T): 11(1456), 12(1404).



Figure 5-67: 1. *Nepeta macrosiphon* Boiss. – 2. *Phlomis armeniaca* Willd.

692. *Phlomis* sp.

(P, F, Fl): 11(983), 12(922), 12(1420).

693. *Prunella vulgaris* L.

(P, F, Fl, Fr, M, I, S, T): 11(1085), 11(1298), 11(1516).

Other collections: Zallm near Khurmall, *Rawi et al. 29498* (BAG, K).

694. *Salvia atropatana* Bunge

Other collections: near Tawella, *Rechinger 12421* (BUH, W).

695. *Salvia bracteata* Banks & Sol.

(P, O, Fl, M, I, T): 11(862),

Other collections: above Darimarr, *Gillett 11849* (BAG, K); near Tawella, *Rechinger 10242* (BUH, W).

696. *Salvia compressa* Vent. (Fig. 69)

(P, F, Fl, M, I): 12(152).



Figure 5-68: *Salvia compressa* Vent. 1. Habit. – 2. Inflorescence. – 3. Basal leaf. – 4. Flower. – 5. Bracts

Other collections: near Susakan, *Rechinger 10196* (BUH, W).

697. *Salvia indica* L.

(*, P, F, Fl, M, I, T): 11(96).

698. *Salvia multicaulis* Vahl

(*, P, R, Fr, M, I, S, T): 12(313).

699. *Salvia palaestina* Benth.

(P, F, Fl, M, I, T): 11(380).

700. *Salvia poculata* Náb.(P, O, Fl, Fr, M, I, T): 11(1024), 12(328), 12(453), 12(667),
12(998).

Other collections: near Tawella, *Rechinger 10366* (BUH, W).

701. *Salvia spinosa* L. (Fig. 5-70: 1)

(P, F, Fl, Fr, M, I, S, T): 11(905), 12(754), 12(901), 13(84).

Other collections: Susakan, *Rechinger 10194* (BUH, W).

702. *Salvia trichoclada* Benth. (Fig. 5-70: 2)

(* , P, F, Fl, Fr, M, I, T): 11(524), 12(859), 12(355), 12(404), 12(543).

Other collections: Kamarspa, *Rawi 22117* (BAG, K); Hawara Berza, *Rawi et al. 29514* (BAG, K).



Figure 5-69: 1. *Salvia spinosa* L. 2. *Salvia trichoclada* Benth.

703. *Satureja cuneifolia* Ten.

Other collections: Hawraman, *Rawi 19772* (BAG, K).

704. *Satureja laxiflora* C.Koch

(A, R, Fl, I, T): 11(1281).

The single record for the species from Kurdistan was collected by Haussknecht from Hawraman and Shahu, but that doubtful record from Iraq is made certain herein.

705. *Satureja macrantha* C.A.Mey. (Fig. 5-71)

(P, Vr, Fl, M, I, T): 12(979), 12(1545).

Other collections: Hawraman Mt., *Rawi et al. 19709* (BAG, K).

This very rare species in Kurdistan Iraq grows in the highest forest and subalpine regions between cliffs.



Figure 5-70: *Satureja macrantha* C.A.Mey. 1. Habit. – 2. Branches. – 3. Flowers

706. *Scutellaria albida* L.

(* , P, O, Fl, Fr, M, S, T): 11(1245), 12(663), 12(1271), 12(1443).

707. *Scutellaria pinnatifida* A. Hamilt. subsp. *pichleri* (Stapf) Rech.f.

(P, F, Fl, Fr, M, I): 11(999), 11(1560), 12(627), 12(1067), 12(1302).

Other collections: Tawella, *Rechinger 10369* (BUH, W).

Four subspecies of *Scutellaria pinnatifida* grow in Kurdistan Iraq. Subspecies *pichleri* differs from subsp. *pinnatifida*, *viridis* (Bornm.) Rech.f. and *alpina* (Bornm.) Rech.f. by having pectinate vs. incised or incised-crenate leaves. The last two subspecies were collected by Haussknecht from Hawraman and Shahu and not seen in this study. Subspecies *alpina* is canescent and with flowers 3–3.5 cm, whereas subsp. *viridis* is green and has corollas generally shorter than 3 cm.

708. *Scutellaria velenovskyi* Rech.f. subsp. *subsimilis* Rech.f.

(P, R, Fl, M, I, S, T): 12(1313).

The previous single record from Kurdistan Iraq was made by Haussknecht in Hawraman and Shahu. Although that collection (at JE) may have been from Iran, the record of the species from Iraq is confirmed in this study.

709. *Stachys ballotiformis* Vatke

(P, R, Fl, M, I, T): 12(983).

The species was previously collected by Haussknecht from Hawraman and Shahu, but that collection was probably from Iran. The occurrence of the species in Hawraman Iraq is confirmed in this study.

710. *Stachys cretica* L.

(* , P, F, Fl, Fr, M, I, T): 11(1178), 12(1308).

711. *Stachys kurdica* Boiss. & Hohen.

(P, F, Fl, Fr, M, I, T): 11(1040), 11(1327), 11(1501), 12(740), 12(1131), 13(116).

Other collections: Kamarspa, *Rawi 22181* (BAG, K); Tawella, *Rawi 21912* (BAG, K); near Tawella, *Rechinger 10255* (BUH, W).

Endemic to Kurdistan of Iraq, Iran, and Turkey.

712. *Stachys lavandulifolia* Vahl

(P, O, Fl, Fr, M, I, T): 12(525), 12(1447).

Other collections: near Tawella, *Rechinger 10311* (BUH, W).

713. *Stachys spectabilis* Choisy ex DC.

Other collections: Hawraman, *Haussknecht s.n.* (JE).

714. *Stachys setifera* C.A.Mey.

(* , P, R, Fl, M, I, T): 12(1202).

715. *Teucrium capitatum* L.

(P, F, Fl, Fr, M, I, T): 11(1180), 1191223), 11(1557), 12(489),
12(537), 12(886), 12(1285), 12(1434).

Other collections: Susakan, *Rechinger 10130* (BUH, W).

There has been substantial confusion regarding the limits of *Teucrium polium* L. and *T. capitatum*. Based on a critical examination of the types of both species and substantial collections from Europe, Asia, and N Africa, it appears that *T. polium* is restricted to NW Africa and SW Europe, and all floristic accounts of *T. polium* from SW Asia and E Europe belong to *T. capitatum* (Navarro, 1995).

716. *Teucrium melissoides* Boiss. & Hausskn. ex Boiss.

(P, Vr, Fl, M, I): 12(1604).

Other collections: Hawraman, *Haussknecht s.n.* (JE).

This species is a very rare endemic in Kurdistan Iraq and Iran.

717. *Teucrium oliverianum* Gingins

(P, F, Fl, M, I): 12(535), 12(870).

718. *Teucrium orientale* L. subsp. *taylori* (Boiss.) Rech.f.

Other collections: near Tawella, *Rechinger 10228, 10229, 12429* (BUH, W).

719. *Teucrium parviflorum* Schreb.

(P, F, Fl, M, I, S, T): 12(456), 12(484).

Other collections: Tawella, *Rawi 21963* (BAG, K).

720. *Teucrium scordium* subsp. *scordioides* (Schreb.) Maire & Petitmengin

(* , P, R, Fl, Fr, M, I, S, T): 11(1164), 12(1605).

721. *Vitex pseudo-negundo* (Hauskn. ex Bornm.) Hand.-Mazz.

(P, F, Fl, M, I, S, T): 12(709), 12(1232).

722. *Ziziphora capitata* L. subsp. *orientalis* Samuelsson ex Rech.f.

(A, C, Fl, M, I, S, T): 11(727), 11(874), 13(7).

Other collections: near Tawella, *Rechinger 12442* (BUH, W).

723. *Ziziphora clinopodioides* Lam. subsp. *kurdica* (Rech.f.) Rech.f.
(Fig. 5-72)

(P, R, Fl, M, I, T): 12(1160), 12(1123), 12(1328).



Figure 5-71: *Ziziphora clinopodioides* Lam. 1. Habit. – 2. Branches. – 3. Inflorescence. – 4. Flowers

Other collections: Hawraman, *Hausknecht s.n.* (JE).

49. Family LILIACEAE

The family is represented in Hawraman by three genera and 10 species, of which four species are new to Hawraman and two to Iraq.

724. *Fritillaria assyriaca* Bak.

(* , P, C, Fr, M, I, T): 11(510), 12(441), 12(521), 12(801), 12(872).

725. *Fritillaria crassifolia* Boiss. & Heut. subsp. *poluninii* Rix.

Other collections: Aarimar, *Gillett 11862* (BAG, K).

726. *Fritillaria imperialis* L.

(P, O, Fl, M, I, T): 11(141), 11(530).

Other collections: Tawella, *Rechinger 10348* (BUH, W).

727. *Fritillaria persica* L.

(P, C, Fl, Fr, M, I, S, T): 11(104), 11(503), 11(516), 11(1007).

Other collections: Tawella, *Rechinger 12390* (BUH, W).

728. *Fritillaria strausii* Bornm.

(** , P, Vr, F, Fr): 11(511), 12(666), 12(728).

Description: Bulbs 1.5–2 cm. Stems 20–50 cm. Leaves 5–10, lanceolate to lanceolate-ovate, opposite. Flowers 1 or 2, campanulate; exterior tepal 23–26 mm, interior tepal 9–13 mm; filaments 9–10 mm, anthers 3–4 mm, style 8–9 mm, papillose.

This is the first record of the species from Kurdistan and Iraq. The species grows on mountain slopes, on clay between limestone, shady places, high mountain forests, and ledges at timberline.



Figure 5-72: *Fritalaria straussi* Bornm. 1. Habit. – 2. Fruits. – 3. Bulb

729. *Tulipa clusiana* DC. (Fig. 5-74)

(**, Vr, Fl, I): 11(20).

Description: Bulbs 1–2 cm, ovoid, tunic brown, clothed with dense wool inside. Stems up to 40 cm, cylindrical, glabrous, erect, green. Leaves 4–6, 8–25 cm, linear or linear-lanceolate. Flowers solitary, broadly campanulate; tepals 6, white with dark pink blotch near the base on the inner and outer surfaces, 3.5–6 cm, lanceolate-elliptic to oblong-lanceolate, apex acute. Stamens 6, somewhat unequal, longer than pistil, dark pink.



Figure 5-73: *Tulipa clusiana* Dc. 1. Habit. – 2. Tepals. – 3. Flower. – 4. Reproductive parts. – 5. Bulb. – 6. Flower bunch

This collection represents the first record for Kurdistan and Iraq. The plants grow in the walnut orchards and sometimes on mountain slopes between oak trees in shady places.

730. *Tulipa systola* Stapf

(P, C, Fl, Fr, M, I, T): 11(129), 11(544), 11(991), 12(373).

Other collections: N of Halabja, *Rawi* 22096 (BAG, K); Kamarspa, *Rawi* 22199 (BAG, K); Tawella, *Rechinger* 10360 (BUH, W).

731. *Gagea dubia* A.Terr.

(* , P, O, Fr, M, I, S, T): 11(238).

732. *Gagea gageoides* (Zucc.) Vved.

(* , P, O, Fl, M, I, S, T): 11(127), 11(570).

733. *Gagea reticulata* (Pall.) J.A. & J.H.Schultes

(* , P, O, Fl, M, I, S, T): 11(13), 11(77), 11(114), 12(277),12(3).

50. Family LINACEAE

This family is represented in Hawraman by one genus and three species, of which one is recorded herein for the first time from the mountain.

734. *Linum bienne* Mill.

(A or P, O, Fl, Fr, M, I, S, T): 11(421).

Other collection: Halabja, *Rawi* 8823 (BAG, K).

735. *Linum nodiflorum* L.

Other collections: Ballkha, *Rawi* 22384 (BAG, K).

736. *Linum strictum* L.

(* , A, C, Fl, Fr, M, I, S, T): 11(455), 12(92), 12(112), 12(236).

51. Family LORANTHACEAE

This family is represented in Hawraman by one genus and one species

737. *Loranthus europaeus* Jacq.

Other collections: Hawraman, *Hausknecht s.n.* (JE).

52. Family LYTHRACEAE

This family is represented in Hawraman by three genera and three species, of which two are new to Hawraman.

738. *Lythrum hyssopifolia* L.

(* , A, F, Fl, Fr, M, S): 11(1156), 11(1545), 12(214), 12(471),
12(1164).

739. *Lythrum salicaria* L.

(* , P, F, Fr, M, I): 11(1174), 12(1168), 12(1254), 12(1600).

740. *Punica granatum* L.

Other collections: Tawella, *Rechinger 10234* (BUH, W).

The species was previously placed in its own family (Punicaceae), but all recent molecular studies show that it is perfectly at home in the Lythraceae.

53. Family MALVACEAE

This family is represented in Hawraman by four genera and ten species, of which three are reported herein for the first time for Hawraman

741. *Alcea arbelensis* Boiss. & Hausskn.

(P, F, Fl, Fr, M, I): 11(1221), 11(1502), 12(686), 12(923),
12(1400).

Other collections: near Tawella, *Rechinger 12362* (BUH, W).

This species is endemic to Kurdistan Iraq and Iran. One collection, *Rechinger 12362*, was cited by Townsend (in Townsend & Guest, 1980) under this and, apparently by mistake, the following species. By contrast, Riedl (1976) cited this collection number as *Alcea rechingeri* (Zohary) I.Riedl, a name that was reduced by Townsend to synonymy of *A. arbelensis*

742. *Alcea kurdica* (Schlecht.) Alef.

(P, F, Fl, Fr, M, I, S, T): 11(237), 11(853), 11(903), 11(1222),
12(304), 12(454), 12(475).

Other collections: Kani Spi, *Rawi 22389* (BAG, K); 8 km N of Kani Spi, *Rawi 22407* (BAG, K); Susakan, *Rechinger 10197* (BUH, W).

743. *Alcea peduncularis* Boiss. & Hausskn.

(P, O, Fl, Fr, M, I): 11(1176), 11(1376), 11(1514).

Other collections: Hawraman, *Haussknecht s.n.* (JE).

744. *Alcea sulphurea* (Boiss. & Hoh.) Alef.

(* , P, F, Fl, Fr, M, I, T): 11(1175), 12(1201), 12(1628).

745. *Althaea cannabina* L.

(P, O, Fl, M, I, S, T): 11(1433), 11(1460), 11(1520), 11(1536).

Other collections: Hawarman, *Rawi et al. 19803* (BAG, K).

746. *Althaea hirsuta* L.

(A, O, Fl, M, I, S, T): 11(61), 11(121), 11(322).

Other collections: Halabja, *Rawi 8819* (BAG, K); Khurmall, *Rawi 8884* (BAG, K); 10 km W of Halabja, *Barkley 7542* (BUA, K); Halabja, *Rawi 8809* (BAG, K); between Halabja and Sirwan, *Botany Staff 43093* (BAG, K).

747. *Althaea officinalis* L.

(* , P, F, Fl, M, I, S): 12(1459).

748. *Hibiscus trionum* L.

Other collections: Hawraman, *Rawi et al. 19839* (BAG, K).

749. *Malva neglecta* Wallr.

(A, F, Fl, Fr, M, I, S, T): 11(911), 11(1291), 11(1592).

Other collections: Hawara Briza, *Rawi et al. 29351* (BAG, K).

750. *Malva nicaeensis* All.

(* , A, F, Fl, Fr, M, I, S, T): 11(442), 11(287), 11(663), 12(42).

54. Family MORACEAE

This family is represented in Hawraman by two genera and three species (one with two varieties), of which one variety is new to Hawraman.

751. *Ficus carica* L. var. *carica*.

(P, C, Fl, Fr, M, I, S, T): 11(715), 11(1100), 11(1425),
11(1428), 11(1430).

Other collections: near Tawella, *Rechinger 12387* (BUH, W).

752. *Ficus carica* L. var. *rupestris* Hausskn. ex Boiss.

(* , P, Fr, M, I, S, T): 11(266), 11(565), 11(1127), 11(1333),
11(1429), 11(1460), 12(375).

753. *Morus alba* L.

(P, C, Fr, M, I, S, T): 11(819), 11(1108), 11(1383), 12(536), 12(919).

Other collections: Hawraman, *Haussknecht s.n.* (JE).

754. *Morus nigra* L.

(P, F, Fr, M, I, S, I): 11(1424), 11(1538), 12(1217).

Other collections: Ahmad Awa, *Guest 13002* (BAG, K).

55. Family OLEACEAE

This family is represented in Hawraman by two genera and three species, of which one is new to Hawraman.

755. *Fraxinus pennsylvanica* Marsh

(* , P, R, Fr, M, I, S, T): 12(1216).

756. *Fraxinus syriaca* Boiss.

(P, F, Fr, M, I, S, T): 11(1537), 12(56).

Other collection: Hawraman Mt., *Rawi et al. 19834* (BAG, K); Biyara, *Gillett 11746* (BAG, K).

757. *Jasminum fruticans* L.

(P, Vr, F, M, I, S, T): 13(112).

Other collection: Hawraman Mt., *Rawi et al. 19779* (BAG, K).

56. Family ONAGRACEAE

This family is represented in Hawraman by two genera and five species, three of them are new to Hawraman.

758. *Circaea lutetiana* L.

Other collections: Hawraman, 1867, *Hausknecht s.n.* (JE).

759. *Epilobium hirsutum* L.

(* , P, F, Fl, M, I, S, T): 11(1353), 12(1212), 12(1457).

760. *Epilobium parviflorum* Schreb.

(* , P, F, Fl, Fr, M, I, S, T): 11(1282), 11(1369), 11(1518).

761. *Epilobium rechingeri* Raven

(* , P, R, Fl, Fr, M, I): 11(1368).

762. *Epilobium tetragonum* Hausskn.

(P, F, Fl, Fr, M, I, S, T): 11(1079).

Other collections: near Tawella, *Rechinger 12386* (BUH, W).

57. Family ORCHIDACEAE

This family is represented in Hawraman by four genera and ten taxa, of which seven are new to Hawraman.

763. *Comperia comperiana* (Stev.) Asch. & Graebn.

(* , R, Fl, M, I, S, T): 11(987), 11(830).

764. *Epipactis veratrifolia* Boiss. & Hohen.

(* , P, R, Fl, M, I, S, T): 11(956), 11(1293).

765. *Ophrys bornmuelleri* M.Schulze ex Bornm.

(* , P, Vr, Fl, M, S, T): 11(18).

766. *Ophrys reinholdii* Fleischm. subsp. *strausii* (Fleishcm. & Bornm.) E.Nels.

(* , P, O, F, M, S, T): 11(175), 12(178).

767. *Ophrys sphegodes* Mill. subsp. *transhyrcana* (Chern.) Soó

(* , P, F, Fl, Fr, M, I, S, T): 11(165), 11(266).

768. *Ophrys umbilicata* Desf.

(* , P, R, F, M, I, S, T): 11(172), 12(174).

769. *Ophrys schulzei* Bornm. & Fleishm.

(* , P, R, Fl, Fr, M, S, I, T): 11(176).

770. *Orchis collina* Banks & Sol. (Fig. 5-75: 1)

(* , P, Vr, Fl, M, I, S, T): 11(135), 11(716).

771. *Orchis palustris* Jacq.

(P, F, Fl, M, I, S, T): 11(224).

Other collections: 10 km W of Halabja, *Barkley 7544, 33247* (BUA, K).

772. *Orchis tridentata* Scop. (Fig. 5-75: 2)

(* , P, Vr, Fl, M, I, S, T): 11(113), 12(267).



Figure 5-74: 1. *Orchis collina* Banks & Sol. – 2. *Orchis tridentata* Scop.

58. Family OROBANCHACEAE

This family is represented in Hawraman by three genera and seven species, of which two are new to Hawraman. This family limit has been expanded to include genera previously placed in the Scrophulariaceae (Mabberley, 2008).

773. *Bartsia trixago* L.

Other collections: between Khurmall and Halabja, *Hadač 5082* (BUH, PR).

774. *Orobanche aegyptiaca* Pers.

(* , A, F, Fl, M, I, S, T): 11(444), 11(714), 12(160).

775. *Orobanche kotschyi* Reut.

(P, O, Fl, M, I): 11(1012), 12(1127).

Other collections: near Tawella, *Rechinger 10325* (BUH, W).

776. *Orobanche kurdica* Boiss. & Hausskn.

(* , P, F, Fl, M, I, T): 11(988), 11(1006).

777. *Orobanche lavandulacea* Rchb.

Other collections: Hawraman, *Haussknecht s.n.* (JE).

778. *Orobanche minor* Sm.

(* , A, Vr, Fl, Fr, T): 11(717).

779. *Parentucellia latifolia* (L.) Caruel subsp. *flaviflora* (Boiss.) Hand.-Mazz.

Other collections: 10 km W of Halabja, *Barkley 7530* (BUA, K).

59. Family PAPAVERACEAE

This family is represented in Hawraman by three genera and 15 species, of which six are new to Hawraman.

780. *Corydalis integra* Boiss.

(* , P, O, Fl, M, T): 11(601).

781. *Corydalis rutiflora* (Sm.) DC.

(* , P, F, Fl M, I, S, T): 12(1).

782. *Fumaria asepala* Boiss.

(A, F, Fl, Fr, M, I, S, T): 11(191), 11(579), 12(336), 12(880).

Other collections: Dara Tri, *Rawi 21988* (BAG, K); Susakan, *Rawi 21830* (BAG, K); Tawella, *Rawi 21945* (BAG, K).

783. *Fumaria cilicica* Hausskn.

(* , A, F, Fl, M, I, T): 11(34), 11(196).

784. *Fumaria densiflora* DC.

Other collections: Khurmali, *Rawi 8886* (BAG, K).

785. *Fumaria parviflora* Lam.

(* , A, F, Fl, Fr, M, I, S, T): 11(276), 11(210), 11(340), 11(368).

788. *Papaver arcochaetum* Bornm.

(P, R, Fl, M, I, T): 11(1054).

Other collections: N of Biyara, *Gillett 11792* (BAG, K); above Tawella, *Rechinger 10265* (BUH, W).

787. *Papaver argemone* L.

(A, F, Fl, M, I, S, T): 11(206), 11(379), 11(839).

Other collections: Tawella, *Rechinger 10303* (BUH, W).

788. *Papaver cylindricum* (L.) DC.

(P, F, Fl, M, T): 11(1025), 12(690).

Other collections: Tawella, *Rawi et al.* 29555 (BAG, K).

789. *Papaver decaisnei* Hochst. ex Steudel

(* , A, F, F, M, I, S T): 11(860), 12(526).

790. *Papaver dubium* L.

(A, F, Fl, M, I, S, T): 11(313), 11(434) 11(466), 11(477),

11(1229), 12(148), 12(167).

Other collections: Susakan, *Rechinger 10169-B* (BUH, W); above Biyara, *Gillett 11787* (BAG, K).

791. *Papaver fugax* Poir. (Fig. 5-76: 1)

(P, F, Fr, M, I, T): 11(1236).

Other collections: Zallm, *Rawi et al.* 29383 (BAG, K); Dara Tri, *Rawi* 22025 (BAG, K); Tawella, *Khatib and Tikriti* 29746 (BAG, K); Hawra Birza, *Rawi et al.* 29395 (BAG, K); Hawraman, *Hausknecht s.n.* (JE).

792. *Papaver glaucum* Boiss. & Hausskn. (Fig. 5-76: 2)

(A, C, Fl, Fr, M, I, S, T): 11(162), 11(798), 11(176),
12(116), 12(469), 12(876).

Other collections: 10 km. W of Tawella, *Rawi* 22146 (BAG, K); Susakan, *Rechinger 10169a* (BUH, W); Tawella, *Rawi* 21897 (BAG, K).



Figure 5-75: 1. *Papaver fugax* Poir. – 2. *Papaver glaucum* Boiss. & Hausskn

793. *Papaver macrostomum* Boiss. & Huet.

(A, F, F, M, I, T): 11(207), 12(31), 12(199).

Other collections: Zallm Mt., *Rawi et al.* 29387 (BAG, K); near Tawella, *Rechinger* 10272, 10310 (BUH, W).

794. *Papaver rhoeas* L.

(* , A, F, F, M, I, S T): 12(197), 12(460), 12(552).

60. Family PLANTAGINACEAE

This family is represented in Hawraman by four genera and 23 species, of which seven are new to Hawraman. Several genera of Scrophulariaceae have recently been moved to the Plantaginaceae (see Mabberley, 2008)

795. *Kichxia elatine* var. *lasiopoda* Dumort.

(* , A, R, Fl, Fr, M, I, S, T): 12(1182).

796. *Linaria genistifolia* (L.) Mill.

(* , P, F, Fl, Fr, M, T): 11(1457), 11(1586), 12(945), 12(994),

12(1365), 12(1480).

797. *Linaria simplex* (Willd) DC.

(**, A, Vr, Fl, Fr, I, S, T): 13(86).

Herbs annual, glabrous throughout, glaucous. Stems 10–40 cm, branched above base, erect to ascending. Leaves cauline, linear, 1–2.7 cm × 1–2 mm, entire, apex acute, those of sterile shoots whorled, those of flowering stems whorled below and alternate above. Raceme densely flowered initially, elongated considerably in fruit; bracts linear, slightly longer than the 1–2 mm glandular-pubescent pedicels. Calyx linear-oblongate, 2–3 mm, glandular pubescent; corolla yellow, tube and lips 3–4.5 mm; spur slender, straight, 2–3 mm; stamens 4, didynamous. Capsule globose, 4–5 mm in diam., glabrous, slightly longer than calyx lobes. Seeds disc-like, 1.5–1.8 mm, with entire wing.

This species is easily distinguished among the other species growing in Iraq by being an annual with yellow, rather small flowers to 7 mm long, globose capsules 4–5 mm long, and discoid seeds with entire-winged seeds.

798. *Plantago afra* L.

Other collections: 10 km W of Tawella, *Rawi 22213* (BAG, K).

799. *Plantago lagopus* L.

(* , A, R, Fl, M, I, T): 11(212), 11(447).

800. *Plantago lanceolata* L. (Fig. 5-77: 1)

(P, F, Fl, M, I, S, T): 11(396), 12(170), 12(610), 12(711),

12(1198).

Other collections: Halabja, *Rawi* 8822 (BAG, K); Biyara, *Rawi et al.* 29485 (BAG, K).

801. *Plantago psyllium* L. (Fig. 5-77: 2)

(* , A, F, Fl, M, I, S, T): 11(477), 12(162).

Other collection: 10 km. W. of Tawella, *Rawi* 22133 (BAG, K).



Figure 5-76: 1. *Plantago lanceolata* L. – 2. *Plantago psyllium* L.

802. *Plantago major* L.

(* , P, F, Fl, Fr, M, I, S, T): 11(1089), 11(1360), 12(1276).

803. *Plantago lagopus* L.

(* , A, R, F): 11(89), 11(1188).

804. *Veronica anagalloides* Guss. subsp. *heureka* M.A.Fisch.

Other collections: near Tawella, *Rechinger* 10290 (BUH, W).

(A or P, F, Fl, Fr, M, I, T): 11(687), 11(1027), 12(714).

805. *Veronica anagallis-aquatica* L.

(A, F, Fl, Fr, M, I, T): 11(1357), 11(1530), 12(63), 12(837).

Other collections; near Tawella, *Rechinger 10157* (BUH, W).

806. *Veronica argute-serrata* Regel & Schmalh.

Other collections: near Tawella, *Rechinger 12439 p.p.* (BUH, W).

807. *Veronica hawramanica* M.A.Fisch.

Other collection: Hawraman, near Tawella, *Rechinger 10334* (BUH, W).

808. *Veronica cymbalaria* Bodard

(A, F, Fl, Fr, M, I, S): 12(293).

Other collections: Khurmall, *Hadač 5043* (BUH, PR).

809. *Veronica hederifolia* L.

(* , A, O, Fl, Fr, I, T):11(31), 11(108), 11(161), 11(670).

810. *Veronica intercedens* Bornm.

(A, R, Fl, Fr, M, I, T):12(742).

Other collections: near Tawella, *Rechinger 12439 p.p.* (W).

811. *Veronica macrostachya* Vahl (Fig. 5-78:1)

(P, O, Fl, Fr, M, I, T): 12(519), 12(792), 12(1141).

Other collections: near Tawella, *Rechinger 10250* (BUH, W).

812. *Veronica orientalis* Mill.

Other collection: Hawraman, *Hausskencht s.n.* (JE).

813 *Veronica persica* Poir.

Other collection: Hawraman, *Hausskencht* 745 (JE).

814. *Veronica polita* Fr.

(* , O, Fl, M, I, T): 11(33).

815. *Veronica rubifolia* Boiss. (fig. 5-78: 2)

(* , A, F, Fl, Fr, M, I, T): 11(847), 11(968), 12(684), 12(724),
12(1051), 13(38).



Figure 5-77: 1. *Veronica macrostachya* Vahl. – 2. *Veronica rubifolia* Boiss.

816. *Veronica* sp. 1

(P, F, Fl, Fr):11(1087), 11(1280), 11(1387), 12(1211),
12(1249).

817. *Veronica* sp. 2

(A, R, Fl):11(670).

61. Family PLATANACEAE

This family is represented in Hawraman by one genus and one species.

818. *Platanus orientalis* L.

(P, F, Fl, M, I, S, T): 11(230), 12(57), 12(1326), 12(1248).

Other collections: Kani Spi, *Rawi* 22425 (BAG, K).

62. Family PLUMBAGINACEAE

This family is represented in Hawraman by two genera and nine species, of which three are new to Hawraman.

819. *Acantholimon brachystachyum* Boiss. ex Bunge

(P, O, Fl, M, I, T): 11(1258)12(1330), 12(1544).

Other collections: Hawraman, *Haussknecht s.n.* (JE), *Rawi et al.* 19777 (BAG, K).

820. *Acantholimon bromifolium* Boiss.

(* , P, R, Fl, M, I, T): 11(256), 11(1491), 12(1283), 12(1508), 12(1535).

821. *Acantholimon caryophyllaceum* Boiss. (Fig. 5-79)

(P, R, Fl, M, I, T): 12(1112), 12(1541).

Other collections: Hawraman, *Rawi et al.* 19730 (BAG, K).



Figure 5-78: *Acantholimon caryophyllaceum* Boiss. 1. Habit. – 2. Branches. – 3. Flowers. – 4. Bracts. – 5. Corolla

822. *Acantholimon latifolium* Boiss. & Noë (Fig. 5-80)

(P, F, Fl, M, I, T): 11(1617), 11(994), 12(1006).



Figure 5-79: *Acantholimon latifolium* Boiss. & Noë 1. Habit. – 2. Basal Leaves. – 3. Inflorescences. – 4. Opened flower

Other collections: Hawar Barza, *Rawi et al.* 29354 (BAG, K).

823. *Acantholimon petraeum* Bunge

(* , P, O, Fl, M, I, T): 12(715), 12(938).

824. *Acantholimon senganense* Bunge

(* , P, Vr, F, M, I, S, T): 12(1501).

825. *Acantholimon* sp.

(P, O, Fl): 11(1256), 11(1491), 12(1283), 12(1394).

826. *Plumbago europaea* L.

(P, F, Fl, M, I, S, T): 12(1226), 12(1582), 12(1634).

Other collections: Hawraman, *Hausknecht s.n.* (JE).

63. Family POACEAE (GRAMINEAE)

This family is represented in Hawraman by 38 genera and 81 species. Of these, 40 species are new to Hawraman.

827. *Aegilops lorentii* Hochst.

(A, F, Fr, M, I, S, T): 11(736), 11(773), 11(899), 11(928),

12(421).

Other collections: Ballkha, 7 km W of Tawella, *Rawi 21871a* (BAG, K).

828. *Aegilops triuncialis* L.

(A, C, Fr, M, I, S, T): 11(392), 11(735), 11(772), 12(247),
12(580), 12(593), 12(676), 12(810), 12(892).

Other collections: Ballkha, 7 km W of Tawella, *Rawi 21854, 22376* (BAG, K); Tawella, *Rawi 21871* (BAG, K).

829. *Aegilops umbellulata* Zhuk.

(A, F, Fr, M, I, S, T): 12(96), 12(263), 13(5).

Other collections: Khurmall, *Rawi 8845* (BAG, K); 10 km W of Tawella, *Rawi 22135* (BAG, K); Tawella, *Rechinger 10209* (BUH, W).

830. *Agrostis gigantea* Roth

(* , P, R, Fl, Fr, M, I, S, T): 11(635), 12(53), 12(111), 12(192),
12(455), 12(968).

831. *Alopecurus apiatus* Ovcz.

(* , P, Vr, Fl, M, I, S, T): 12(964).

832. *Alopecurus myosuroides* Huds.

(* , A, O, Fl, Fr, M, I, S, T): 11(226), 11(678), 12(66).

833. *Alopecurus utriculatus* Banks & Sol.

Other collections: Khurmall, *Rawi 8849* (BAG, K).

834. *Arrhenatherum elatius* (L.) P.Beauv.

Other collections: above Darimarr, *Rawi 12250* (BAG, K).

835. *Arrhenatherum kotschyi* Boiss. (Fig. 5-81)

(P, R, Fl, Fr, M, I, S, T): 12(364), 12(503), 12(640).

Other collections: Kamarspa, *Rawi 22249* (BAG, K); N of Biyara, *Gillett 11797* (BAG, K)



Figure 5-80: *Arrhenatherum kotschyi* Boiss. 1. Habit. – 2. Spike. – 3. Spikelet. – 4. Bulbs

836. *Avena barbata* Pott ex Link

(* , A, F, Fr, M, I, S, T): 11(816), 11(973), 12(447),

12(578).

837. *Avena clauda* Durieu

(* , A, R, Fr, M, I, S, T): 12(257).

838. *Avena eriantha* Durieu

(* , A, R, Fr, M, I, S, T): 12(93).

839. *Avena fatua* L.

(* , A, F, Fr, M, I, S, T): 12(301).

840. *Avena ludoviciana* Durieu

(A, F, Fr, M, I, S, T): 11(98), 11(393), 12(27), 12(137),
12(198), 12(249).

Other collections: Ballkha, 7km N of Tawella, *Rawi* 22359 (BAG, K).

841. *Avena wiestii* Steud.

(* , A, F, Fl, M, I, S, T): 11(197), 11(410), 12(168), 12(265),
12(282), 12(601).

842. *Boissiera squarrosa* (Banks & Sol.) Nevski

(A, F, Fl, M, I, T): 11(873), 13(10).

Other collections: N of Hallabja, *Rawi* 22070 (BAG, K); N of Biyara, *Gillett* 11769 (BAG, K).

843. *Bothriochloa ischaemum* (L.) Keng

(P, O, Fl, M, I, S, T): 12(1192), 12(1630).

Other collections: Hawara Barza, *Rawi and Nuri* 294841 (BAG, K).

844. *Brachypodium pinnatum* (L.) P.Beauv.

(* , P, R, Fr, M, I, T): 11(1309).

845. *Brachypodium sylvaticum* (Huds.) P.Beauv.

(P, F, Fr, M, I, S, T): 11(1104), 11(1290), 11(1435), 12(1245).

Other collections: Zallm, Near Khurmall, *Rawi et al.* 29488 (BAG, K).

846. *Bromus commutatus* Schrad.

(* , A, F, Fl, Fr, M, I, T): 11(397), 11(642), 12(67), 12(83), 12(137).

847. *Bromus danthoniae* Trin. var. *danthoniae*

(A, F, Fr, M): 12(123), 12(202), 12(274), 12(749).

Other collections: 10 km W of Tawella, *Rawi* 22149 (BAG, K).

848. *Bromus danthoniae* Trin. var. *lanuginosus* Roshev.

(A, F, Fr, M): 11(251), 11(383), 11(443), 12(549).

Other collections: Kamarspa, *Rawi* 22257 (BAG, K); 8 km N of Kani Spi, *Rawi* 22405 (BAG, K); Tawella, *Rawi* 21973 (BAG, K).

849. *Bromus intermedius* Guss.

(**, A, Vr, Fl, I, S, T): 12(818).

Annuals or biennials. Culms geniculately ascending, 30–50 cm tall. Leaves softly and sparsely white hairs; blade narrowly linear, 3–8 cm × 2–3 mm; sheath tubular, softly pubescent. Panicle erect, short-branched; spikelets often single per branch, ca. 15 mm, somewhat reddish brown. Glumes soft pubescent, 6–9 mm, outer 4–6 veined; inner 7–9 veined; lemma ca. 9 mm, pubescent, acuminate, subapically with a strongly recurved, scabrid awn.

The species was listed in the Flora of Iraq as possibly occurring in the country, but no specimens were cited. The above collection, which represents the first record for Iraq, was gathered at 2048 m on rocky places in Daramar Mountain.

850. *Bromus lanceolatus* Roth

(* , F, Fr, M, I, T): 11(854), 12(665), 12(788), 12(1016).

851. *Bromus madritensis* L.

(* , A, F, Fl, Fr, M, I, S, T): 11(145), 11(265), 11(756),

11(974), 12(140).

852. *Bromus scoparius* L.

(* , A, F, Fl, Fr, M, I, S, T): 11(263), 11(488), 11(471), 11(643),
12(117), 12(444).

853. *Bromus sterilis* L.

(* , A, F, Fl, Fr, M, I, S, T): 11(661), 11(855), 12(16), 12(118),
12(191), 12(368).

854. *Bromus tectorum* L. var. *tectorum*

(A, F, Fl, Fr, M, I, S, T): 11(87), 11(362), 11(554), 11(586),
12(140), 2(658), 12(750), 1038).

Other collections: 10 km W of Tawella, *Rawi 22150* (BAG, K).

855. *Bromus tomentellus* Boiss. (Fig. 5-82)

(* , P, R, Fr, M, I, S, T): 12(511).



Figure 5-81: *Bromus tomentellus* Boiss. 1. Habit. – 2. Reticulate basal stem fibres

856. *Bromus* sp.

(A, R, Fl): 12(49)

857. *Calamogrostis pseudophragmites* (Hall.f.) Koel.

(* , P, F, Fr, M, I, S, T): 12(836).

858. *Catapodium rigidum* (L.) C.E.Hubb.

(* , A, R, Fl, M, I, T): 11(474), 12(120), 12(223).

859. *Cynodon dactylon* (L.) Pers.

(* , P, C, Fl, M, I, S, T): 11(435).

860. *Cynosorus elegans* Desf.

(* , A, R, Fl, M, I, S, T): 11(260), 11(747).

861. *Dactylis glomerata* L.

(A, F, Fl, Fr, M, I, S, T): 11(406), 11(531), 11(887), 11(996),

11(1330), 11(1569), 12(690), 12(791), 12(953), 12(137).

Other collections: Kamarspa, *Rawi 22213* (BAG, K); Tawella, *Rawi 21942* (BAG, K); near Tawella, *Rechinger 10214* (BUH, W).

862. *Echinaria capitata* (L.) Desv.

(* , A, R, Fr, M, I, S, T): 11(499).

863. *Eremopoa persica* (Trin.) Rozhev.

(A, F, Fl, Fr, M, I, S, T): 11(683), 11(782), 11(848),

11(1489), 12(683), 12(807), 12(823).

Other collections: Tawella, *Rawi 21939* (BAG, K).

864. *Heterantheium piliferum* (Banks & Sol.) Hochst.

(A, F, Fl, Fr, M, I, S, T): 11(347), 11(543), 11(758), 11(872), 12(154), 11(268), 12(417), 12(532), 12(584), 13(66), 12(787).

Other collections: N of Hallabja, *Rawi* 22077 (BAG, K); 10 km W of Tawella, *Rawi* 22158 (BAG, K).

865. *Hordeum bulbosum* L.

(P, F, Fl, Fr, M, I, S, T): 11(177), 11(332), 469), 12(806), 12(1068), 13(67).

Other collections: Kamarspa, *Rawi* 22233 (BAG, K).

866. *Hordeum glaucum* Steud.

(* , A, C, Fl, Fr, M, I, S, T): 12(59), 12(577).

867. *Hordeum leporinum* Link

(A, R, Fl, Fr, M, I, S, T): 12(32).

Other collections: 8 km N of Kani Spi, *Rawi* 22396 (BAG, K).

868. *Hordeum marinum* Huds.

(* , A, F, Fl, Fr, M, I, S, T): 11(429), 11(431), 12(228), 12(817).

869. *Hordeum spontaneum* C.Koch

(* , A, F, Fr, M, I, S, T): 11(394), 11(445), 11(538), 734, 794), 12(431), 12(413), 12(541), 12(888), 13(49).

870. *Hordeum vulgare* L.

(* , A, C, Fr, I, S, T): 11(962), 11(1066), 12(36).

This collection represents an escape from an otherwise widely cultivated species.

871. *Imperata cylindrica* (L.) P.Beauv.

(* , P, F, Fl, Fr, M, I, S, T): 11(660), 12(702).

872. *Lolium loliaceum* (Bory & Chaub.) Hand.-Mazz.

(* , A, O, Fl, Fr, M, I, S, T): 11(1401), 12(145), 12(603).

873. *Lolium multiflorum* Lam.

(* , B, Vr, Fr, M, I, T): 11(1251).

874. *Lolium perenne* L.

(* , P, F, Fr, M, I, S, T): 12(796), 12(1062), 12(1154),
12(1483).

875. *Lolium rigidum* Guadin

(A, F, Fl, Fr, M, I, S, T): 11(264), 11(490), 11(323), 11(563),
11(629), 11(757), 12(44), 12(133), 12(209), 12(227).

Other collections: 8 km N of Kani Spi, *Rawi* 22397 (BAG, K); Ballkha, *Rawi* 22161 (BAG, K); Tawella, *Rawi* 21929 (BAG, K).

876. *Lolium temulentum* L.

(A, Vr, Fr, M, I, S, T): 11(634).

Other collections: 10 km N of Tawella, *Rawi* 22136 (BAG, K).

877. *Lolium* sp. 1

(A, Vr, Fr): 11(1251).

878. *Lophochloa berythea* (Boiss. & Blanche) Bor

(A, F, Fl, Fr, M, I, S, T): 11(214), 11(280), 11(413),
11(562).

Other collections: near Tawella, *Rechinger s.n.* (BUH, K, W).

879. *Melica jacquemontii* Decne.

(P, Vr, Fr, M, I, S, T): 11(1019), 12(1070).

Other collections: Kamarspa, *Rawi 22240* (BAG, K); N of Biyara, *Gillett 11800* (BAG, K).

880. *Melica persica* Kunth subsp. *inaequiglumis* (Boiss.) Bor (Fig. 5-83)

(P, F, Fl, M, I, S, T): 12(384), 12(613).

Other collections: Hawara Barza, *Rawi et al. 29336* (BAG, K).



Figure 5-82: *Melica persica* subsp. *inaequiglumis* (Boiss.) Bor

881. *Melica persica* Kunth subsp. *persica*

(P, F, Fr, M, I, T): 11(1078), 11(1246), 12(1039), 12(1354).

Other collections: Tawella, *Rawi 21914* (BAG, K).

882. *Milium pedicellare* (Bornm.) Rozhev. ex Mederis

(A, F, Fr, M, I, S, T): 11(375).

Other collections: N of Biyara, *Gillett 11780* (BAG, K).883. *Oryzopsis holciformis* (M.Bieb.) Hack.

(P, F, Fl, Fr, M, I, S, T): 11(10390, 11(1470), 11(1619),

12(403), 12(635), 12(1017).

Other collections: Hawrabarza, *Rawi and Nuri 29345* (BAG, K); Kamarspa, *Rawi 22251* (BAG, K); Tawella, *Rawi 21935* (BAG, K).884. *Phalaris arundinacea* L. (Fig. 5-84)

(P, Vr, Fr, M, I, S, T): 11(675).

Other collections: Shaikh Sadiq, on Hallabja road, *Haines 2034* (K).Figure 5-83: *Phalaris arundinacea* L. 1. Habit. – 2. Panicle. – 3. Basal portion of stem

This is a very rare species in Kurdistan Iraq, only once recorded near Sheikh Sadiq village on Halabja road based on a collection by R.W. Haines (Bor in Townsend et al., 1968, 1970), and also collected only in same area during the current study.

885. *Phalaris brachystachys* Link

(* , A, R, Fr, M, I, S, T): 11(684).

886. *Phalaris paradoxa* L.

(* , A, O, Fl, M, I, S, T): 11(400).

887. *Phleum boissieri* Bornm.

(* , A, R, Fl, M, I, S, T): 11(953).

888. *Phragmites australis* (Cav.) Trin. ex Steudel

(* , P, C, Fl, M, I, S, T):12(1612).

889. *Poa annua* L.

Other collections: 10 km W of Tawella, *Rawi 22151* (BAG, K).

890. *Poa bulbosa* L.

(P, C, Fl, Fr, M, I, S, T): 11(60), 11(90), 11(345), 11(575), 12(175),
12(182), 12(344), 12(366), 12(423), 12(741), 12(1015).

Other collections: Kamarspa, *Rawi 22195* (BAG, K).

891. *Poa timoleontis* Heldr. ex Boiss.

(* , P, R, Fl, M, I, S, T): 11(257), 12(176).

892. *Polypogon semiverticillatus* (Forssk.) Hyl.

(* , P, F, Fl, M, I, T): 11(729).

893. *Psilurus incurvus* (Gouan) Schinz & Thell.

(* , A, Vr, Fl, M, I, S, T): 12(119).

894. *Saccharum ravennae* (L.) Murray

(* , P, Vr, Fl, M, I, S, T): 12(1611).

895. *Secale montanum* Guss. (Fig. 5-85)

(P, F, Fr, M, I, S, T): 11(623), 11(1406), 11(1413), 12(1288).

Other collections: Zallm, near Khurmall, *Rawi et al.* 29378 (BAG, K); N of Hallabja, *Rawi* 22183 (BAG, K); Hawara Barza, *Rawi at al.* 29361 (BAG, K).



Figure 5-84: *Secale montanum* Guss. 1. Habit. – 2. Spike. – 3. Portion of stems

This species is frequent in upper forest zone, penetrating up into the thorn-cushion zone between 1350–1900 m.

896. *Setaria viridis* (L.) P.Beauv.

(* , A, O, Fl, M, I, S, T): 11(1274).

897. *Sorghum halepense* (L.) Pers.

(* , P, F, Fl, Fr, M, I, S, T): 11(1312), 12(614), 12(1173).

898. *Stipa barbata* Desf.

(P, R, Fr, M, I, S, T): 12(660), 12(1148).

Other collections: Hawara Barza, *Rawi et al.* 29352 (BAG, K); Susakan, *Khatib and Tikriti* 29758 (BAG, K).

899. *Stipa kurdistanica* Bor (Fig. 5-86)

(P, R, Fl, Fr, M, I): 12(1116), 12(1547).

Other collections: Hawraman, *Hausknecht 1017* (JE).

Habitat: Mountain slopes, between limestones.

Distribution: very rare endemic species in Kurdistan Iraq, where it grows in a restricted area at 2250 m and a small population of not more than 250 plants.

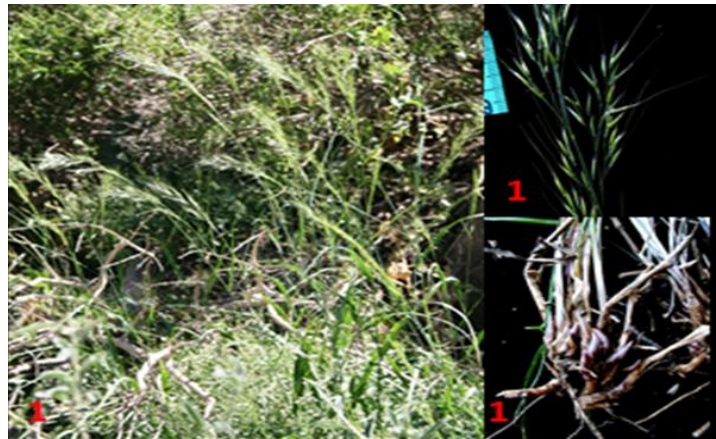


Figure 5-85: *Stipa kurdistanica* Bor. 1. Habit. – 2. Spikelets. – 3. Basal part of stem

900. *Taeniatherum asperum* (Simonkai) Nevski

(* , A, R, Fl, M, I, S, T): 12(86).

901. *Taeniatherum crinitum* (Schreb.) Nevski

(A, C, Fr, M, I, T): 11(771), 11(856), 11(897),

11(927), 12(273), 12(1060), 13(61).

Other collections: N of Hallabja, *Rawi 22112a* (BAG, K); 10 km W of Tawella, *Rawi 22141* (BAG, K); Ballkha, *Rawi 21858* (BAG, K).

902. *Trachynia distachya* (L.) Link var. *hispida* (Pamp.) Bor

(* , A, F, Fr, M, I, S, T): 11(233), 11(273), 11(288), 11(453),
12(82), 12(250).

903. *Triticum aestivum* L.

(A, C, Fr, I, S, T): 12(43).

Cultivated species.

904. *Triticum dicoccoides* (Koern. ex Aschers. & Graebn.) Aaronsohn

Other collections: above Darimarr, *Gillett 11836* (BAG, K).

905. *Vulpia ciliata* Link.

(* , A, O, Fl, Fr, M, I, S, T): 12(90), 12(264).

906. *Vulpia hirtiglumis* Boiss. & Hausskn.

(* , A, Vr, Fl, M, I, S, T): 11(648).

907. *Vulpia myuros* (L.) C.C.Gmelin

(* , A, Vr, Fl, M, I, S, T): 12(185).

908. *Vulpia persica* (Boiss. & Buhse) V. Krecz. & Bobrov

(* , A, Vr, Fl, M, I, S, T): 11(432), 12(186).

64. Family POLYGONACEAE

This family is represented in Hawraman by four genera and 17 species, of which nine are new to the mountain.

909. *Atraphaxis tournefortii* Jaub. & Spach (Fig. 5-87)

(* , P, Vr, Fr, M, I): 12(1333).



Figure 5-86: *Atraphaxis tournefortii* Jaub. & Spach. 1. Habit. – 2. Branchs. – 3. Fruits

910. *Polygonum arenastrum* Boreau

(* , P, F, Fl, M, I, T): 11(1238), 12(1240), 12(1607).

911. *Polygonum aviculare* L.

(* , P, F, Fl, M, I, T): 11(1239), 11(1399), 12(916), 12(1237),

12(1312).

912. *Polygonum convolvulus* L.

(** , P, R, Fr, I, T): 11(1308), 11(1362), 11(1396), 12(1624).

Herbs perennial, puberulent, climbing or crawling. Stems slender, to 1 m long, striate, minutely puberulent. Leaves sagittate-cordate, 1–5 × 1–3 cm, entire, acute to acuminate; petiole 1–3 cm, puberulent; ochrea brownish, split, to 2 mm. Flowers up to 6 in spike-like fascicles; fruiting pedicels 1–2 mm, articulate above the middle. Perigonium 2–2.5 mm, 5-parted, accrescent and distinctly trigonous in fruit. Fruits 4–5 mm, black, triangular, finely granular.

The species is readily distinguished by its cordat-sagittate leaves that resemble those of *Convolvulus arvensis* L. and its climbing habit.

913. *Polygonum luzuloides* Jaub. & Spach

(P, F, Fl, Fr, M, I, T): 11(1224), 12(1304), 12(1388), 12(1412), 12(1530).

Other collections: Hawraman and Shahu, *Hausknecht s.n.* (JE).
The above collection could be from Kurdistan Iran.

914. *Polygonum patulum* M.Bieb.

Other collection: Kani Spi, nr. Tawella, *Rechinger 12350* (BUH, W).

915. *Polygonum persicaria*

(* , A, F, Fl, Fr, M, I, S, T): 11(636), 11(1304).

916. *Polygonum polycnemoides* Jaub. & Spach

(* , A, F, Fl, M, I): 11(1624).

917. *Polygonum hydropiper* L.

(** , A, F, Fl, I, T): 12(1597).

Plants annual, glabrous. Stems erect to ascending, 30–60 cm, rooting from lower nodes. Ochrea brown, tubular, truncate at apex, with cilia 0.5–2 mm. Leaves lanceolate 2–6(-8) × 0.5-1(-1.5) cm, entire acuminate, minutely ciliate, otherwise glabrous. Inflorescence very lax, filiform spike with distant flowers. Bract not ciliate, collectively funnel form perigonium 2.5–4 mm, greenish with brown dots. Nutlet ca. 3mm, trigonal, granular-striate, styles 3, basally united.

This species is easily distinguished by its slender, lax spikes; brown, truncate, ciliate ochrea; brown-dotted perigonium; and trigonal, granular-striate nutlets with three, basally united styles.

918. *Rheum ribes* L. (Fig. 5-88)

(* , P, C, Fl Fr, M, I, T): 11(167), 11(537), 12(352), 12(1363).



Figure 5-87: *Rheum ribes* L. 1. Habit. – 2. Frutis

919. *Rumex conglomeratus* Murr.

Other collections: Susakan, *Rechinger 10152* (BUH, W).

920. *Rumex* cf. *crispus* L.

(* , P, F, Fr, M, I, T): 12(951).

921. *Rumex dentatus* L.

(* , A, F, F, M, I, S, T): 11(631), 11(694), 12(907).

922. *Rumex ponticus* E.H.L.Krause

(P, R, F, M): 12(990).

Other collection: Hawraman, *Haussknecht s.n.* (JE).

923. *Rumex pulcher* L.

(P, F, Fl, M, I, S, T): 12(474).

Other collections: Tawella, *Rechinger 10231* (BUH, W).

924. *Rumex tuberosus* L.

(* , P, O, Fl, Fr, M, I, T): 12(812).

925. *Rumex* sp. 1

(P, R, F, M): 12(990).

65. Family PORTULACACEAE

This family is represented in Hawraman by one genus and one species first recorded herein.

926. *Portulaca oleracea* L.

(* , A, F, Fl, M, I, S, T): 11(1400).

66. Family POTAMOGETONACEAE

This family is represented in Hawraman by one genus and one species.

927. *Potamogeton nodosus* Poir. (Fig. 5-89).

(P, O, F, M, I, S, T): 11(702).

Other collections: Khurmali, *Rawi et al.* 29451 (BAG, K); This species is rare in Hawraman, and the small population studied herein was growing in a marshland by the end of Zallm River near Darbandikhan Lake.



Figure 5-88: *Potamogeton nodosus* Poir.

67. Family PRIMULACEAE

This family is represented in Hawraman by three genera and three species, one of them is new to Hawraman.

928. *Anagallis arvensis* L.

(A, F, Fl, Fr, M, I, S, T): 11(231), 11(480), 11(630).

Other collections: Khurmall, *Rawi* 8423 (BAG, K).

929. *Dionysia bornmuelleri* (Pax) Clay (Fig. 5-90)

(* , P, Vr, Fr, M, I): 12(851).

This is a very rare species endemic to Hawraman and Kurdistan Iraq. There is a small population with few individuals in Sargat Valley, where it grows in a small cave entrance between cliffs.

According to the IUCN criteria, B (geographic range) and D (very small and restricted population, this species is critically endangered.



Figure 5-89: *Dionysia bornmuelleri* (Pax) Clay. 1. Habit. – 2. Basal leaves. – 3. Flowers

930. *Lysimachia dubia* Sol.

(A, R, Fl, Fr, M, I,): 11(1161), 12(1204).

The above collections probably represent the second report of the species from Iraq. The first collection, see below, was reported by Wendelbo (see Fl. Iranica 9: 32. 1965).

Other collections: 34 km. west Sulaimani, *Rech. 10567* (BUH, W)

68. Family PTERIDACEAE

The family is represented in Hawraman by two genera and three species.

931. *Adiantum capillus-veneris* L.

(P, F, M, I, S, T): 11(709), 11(1133).

Other collections: Hawraman, *Rawi 8931* (BAG, K).

932. *Cheilanthes fragrans* (L.f.) Sw.

Other collections: Hawraman, *Rawi 8935* (BAG).

933. *Cheilanthes persica* (Bory & Bélanger) Mett. ex Kuhn.

Other collections: Hawraman and Shahu, *Haussknecht s.n.* (JE).

69. Family RAFFLESIACEAE

This family is represented in Hawraman by one genus and one species.

934. *Pilostyles haussknechtii* Boiss. (Fig. 5-91)

(P, Vr, Fl, M, I): 12(1076), 12(1156), 13(53)

Other collections: Hawraman, *Haussknecht s.n.* (JE).



Figure 5-90: *Pilostyles haussknechtii* Boiss. – 1. and 2. Plant on *Astragalus*. – 3. Flowers

70. Family RANUNCULACEAE

This family is represented in Hawraman by seven genera and 26 species, of which nine are new to Hawraman.

935. *Adonis annua* L. (Fig. 5-92: 1)

(A, F, Fl, Fr, M, I, S, T): 11(406), 11(644), 12(76).

Other collections: Hawraman, *Rechinger 12361* (BUH, W).

936. *Adonis dentata* Del.

(* , A, F, Fr, M, I, S, T): 12(592).

937. *Adonis microcarpa* DC.

(* , A, F, Fl, M, I, S, T): 11(220).

938. *Anemone coronaria* L. (Fig. 5-92: 2)

(* , P, C, Fl, I, S, T): 11(8), 11(40).



Figure 5-91: 1. *Adonis annua* L. – 2. *Anemone coronaria* L.

939. *Clematis orientalis* L.

Other collectios: Hawraman, *Rawi et al. 19815* (BAG, K).

940. *Delphinium macrostachyum* Boiss. ex Huth (Fig. 5-93)

(P, Vr, Fl, Fr, M, I): 12(1089), 12(1553).

Other collections: Ballkha, 7 km W Tawella, *Rawi et al. 29481* (BAG, K).



Figure 5-92: *Delphinium macrostachyum* Boiss. ex Huth. 1. Habit. – 2. Roots. – 3. Inflorescens. – 4. Flowers

941. *Delphinium micranthum* Boiss. & Hoh.

(P, F, Fl, Fr, M, I, T): 11(494), 12(1152), 12(1361).

Other collection: Hawraman, *Rawi et al. 19781* (BAG, K).

942. *Delphinium pallidiflorum* Freyn

(P, R, F, M, I, T): 12(1505).

Other collections: Kamarspa, *Rawi 22200* (BAG, K); Hawraman, above Darimarr, *Gillett 11782* (BAG, K).

The species was listed in the Flora of Iraq (vol. 4 (2): 688) as a synonym of *Delphinium tuberosum* Auch. ex Boiss. However, the latter species is endemic to Iran.

943. *Delphinium peregrinum* L.

(* , A, R, Fl, M, I, S, T): 11(1265).

944. *Delphinium quercetorum* Boiss. & Hausskn.

(P, F, Fl, M, I, T): 11(992), 11(1036), 12(401), 12(1051).

Other collections: Hawraman, near Tawella, *Rechinger 10349* (BUH, W).

945. *Delphinium kurdicum* Boiss. & Hohen.

(* , P, F, Fl, I, T): 12(500).

The above first record in Hawraman also represent first recorded for sulaimani province.

946. *Nigella arvensis* L.

(* , F, Fl, Fr, M, I, T): 11(1263).

947. *Nigella oxypetala* Boiss.

(A, F, Fl, Fr, M, I, S, T): 11(903), 11(923), 12(416).

Other collections: Hawraman, near Tawella, *Rechinger 10239* (BUH, W).

948. *Nigella sativa* L.

Other collections: Hawraman, *Rawi et al. 19835* (BAG, K).

949. *Ranunculus arvensis* L.

(A, F, Fl, Fr, M, I, S, T): 11(320), 11(693), 12(206),
12(579).

Other collections: Ballkha, *Rawi 21841* (BAG, K); Dara Tri, *Rawi 22035* (BAG, K).

950. *Ranunculus asiaticus* L.

(* , A, C, Fl, Fr, M, I, S, T): 11(766), 12(91).

951. *Ranunculus aucheri* Boiss.

(* , A, F, Fl, Fr, M, I, S, T): 12(75), 12(276).

952. *Ranunculus chius* DC.

(A, F, Fl, Fr, M, I, T): 11(27), 11(188), 11(405), 12(46).

Other collections: Khurmall, *Rawi 8966-Y* (BAG, K).

953. *Ranunculus cornutus* DC.

(A, C, Fl, Fr, M, I, S, T): 11(402), 11(607), 12(42).

Other collections: 10 km W Halabja, *Barkley 7536* (BUA, K).

954. *Ranunculus macrorhynchus* Boiss.

(P, F, Fl, M, I, S, T): 11(47), 11(341).

Other collections: Kamarspa, *Rawi* 22245 (BAG, K); Abu Ahida, near Halabja, *Omar et al.* 37462 (K); Tawella, *Rawi* 21980 (BAG, K); near Tawella, *Rechinger* 10384 (BUH, W).

955. *Ranunculus millefolius* Banks & Sol.

(A, F, Fl, M, I, T): 11(174).

Other collections: near Tawella, *Rechinger* 10277 (BUH, W).

956. *Ranunculus oxyspermus* Willd.

(* , A, F, Fl, M, I, S, T): 11(195), 11(344), 12(363).

957. *Ranunculus sericeus* Banks & Sol.

(P, C, F, Fr, M, I, T): 12(168), 12(472), 12(967).

Other collections: 13 km N Kani Spi, *Rawi* 22429 (BAG, K).

958. *Ranunculus sphaerospermus* Boiss. & Blanche (Fig. 5-94).

(P, R, Fl, M, I, T): 11(222).



Figure 5-93: *Ranunculus sphaerospermus* Boiss. & Blanche. 1. Habit. – 2. Branches. – 3. Flowers. – 4. Fruits

Other collections: Khurmall, *Rawi* 8924 (BAG, K).

959. *Ranunculus* 1

(A, R, Fl, Fr): 12(174).

960. *Thalictrum sultanabadense* Stapf

(* , F, Fl, Fr, M, I, S, T): 11(114), 12(329), 12(518).

71. Family RESEDACEAE

This family is represented in Hawraman by one genus and one species not previously reported for the mountain.

961. *Reseda alba* L.

(* , P, F, Fl, Fr, M, I, S, T): 12(1413).

72. Family RHAMNACEAE

This family is represented in Hawraman by three genera and five species (one with two varieties).

962. *Paliurus spina-christi* Mill. var. *macrocarpa* Beck

Other collections: Hawraman, *Chakravarty et al.* 19716 (BAG, K).

963. *Paliurus spina-christi* Mill. var. *spina-christi*

(P, F, Fl, Fr, M, I, S, T): 11(1449), 12(555), 12(1199).

Other collections: Halabja, *Rawi* 8922 (BAG); Hawraman, *Rawi et al.* 12778X (BAG, K).

964. *Rhamnus cornifolia* Boiss. & Hoh.

(P, O, Fl, Fr, M, I, T): 12(722), 12(1366), 12(1482),

12(1525).

Other collections: Hawraman, *Gillett 11886* (BAG, K), *Rawi et al. 19762* (BAG, K), *Haussknecht s.n.* (JE).

965. *Rhamnus kurdica* Boiss. & Hoh.

(P, O, F, M, I, S, T): 11(268), 12(759), 12(1113), 12(1352).

Other collections: Hawraman, *Rawi et al. 19745* (BAG, K); above Darimarr, *Gillett 11831* (BAG, K).

966. *Ziziphus jujuba* Mill.

(P, O, Fl, M, I, S, T): 11(1068), 11(1342).

Other collection: Tawella, *Rawi 21893* (BAG, K), *Rechinger 10235* (BUH, W), *Haussknecht s.n.* (JE).

73. Family ROSACEAE

This family is represented in Hawraman by nine genera and 41 species, of which 13 are new to Hawraman and 1 new to Kurdistan Iraq. The genus *Prunus* L. was treated in the Flora of Iraq (Meikle in Townsend et al., 1966) in the broad sense but was divided in Flora Iranica (Browicz in Rechinger, 1969) into several segregates (e.g., *Amygdalus*, *Armeniaca*, *Cerasus*, *Padus*, *Persica*). Extensive molecular studies (see AP website) strongly support the retention of *Prunus* in the classical sense. Therefore, accepted names in both Meikle and Browicz are given below.

967. *Agrimonia eupatoria* L.

(P, F, Fl, Fr, M, I, S, T): 11(1211), 11(1511), 12(1189),

12(1163), 12(1321).

Other collections: Hawraman, *Rawi et al. 19819* (BAG, K).

968. *Crataegus azarolus* var. *aronia*

(P, C, Fl, Fr, M, I, S, T): 11(327), 11(980), 11(1450),
12(648), 12(869), 2(1427).

Other collections: Hawraman, *Rawi 22101* (BAG, K); Tawella, *Rechinger 10230* (BUH, W).

969. *Crataegus meyeri* Pojark.

(* , P, R, Fr, M, I, T): 11(763).

970. *Crataegus monogyna* Jacq. (Fig. 5-95)

(* , P, O, Fr, M, I, S, T): 12(1631).



Figure 5-94: *Crataegus monogyna* Jacq. 1. Habit. – 2. Branch. – 3. Leaves. – 4. Fruits

971. *Geum urbanum* L.

(* , P, F, Fl, Fr, M, I, T): 11(25), 11(169), 1(710), 11(913),
11(1285), 11(1295), 11(1358), 12(449), 12(845), 12(1247),

Other collections: 3 km W of Biyara, *Rawi et al. 29553* (BAG, K); Zallm, *Rawi et al. 29487* (BAG, K); Susakan, *Rechinger 10182* (BUH).

972. *Potentilla hirta* L.

(* , P, R, Fl, M, I, S, T): 12(473).

973. *Potentilla kurdica* Boiss. & Hohen.

(* , P, O, Fl, M, I, T): 12(962).

974. *Potentilla pannosa* Boiss. & Hausskn.

Other collections: above Darimarr, *Gillett 11980* (BAG, K).

975. *Potentilla reptans* L.

(P, R, Fl, M, I, S, T): 11(1531), 12(836).

Other collections: Tawella, *Rechinger 12420* (BUH, W).

976. *Potentilla speciosa* Willd.

Other collections: Hawraman, *Rawi et al. 19748* (BAG, K).

977. *Potentilla supina* L.

(* , Vr, Fl, M, T, I): 11(685).

978. *Poterium lasiocarpum* Boiss. & Hausskn.

(P, F, Fl, Fr, M, I): 11(726), 11(787), 11(1186), 12(486).

Other collections: NE of Darbandi Khan, *Poore 547* (K); near Tawella, *Rechinger 10301 a, b* (BUH, W).

979. *Poterium sanguisorba* L. subsp. *muricatum* (Spach) Rouy & Fouc.

980. *Prunus amygdalus* Batsch

(Syn. *Amygdalus communis* L.).

(* , P, Fl, Fr, M, I, S, T): 11(164), 11(769), 11(942), 11(1301), 12(5), 12(391), 11(889), 12(1426), 13(127).

Although this species is widely cultivated in Kurdistan, it has never been previously collected and reported from Hawraman.

981. *Prunus arabica* (Oliv.) Meikle (Fig. 5-96)(Syn. *Amygdalus arabica* Oliv.).

(P, F, Fr, M, I, S, T): 11(1077), 12(157).

Figure 5-95: *Prunus arabica* (Oliv.) Meikle. 1. Habit. – 2. BranchesOther collections: Tawella, *Rawi 21904* (BAG, K).982. *Prunus argentea* (Lam.) Rehd. (Fig. 5-97)(Syn. *Amygdalus argentea* Lam., *A. oreintalis* Duh.)

(P, F, Fr, M, I, S, T): 12(971), 12(1355), 12(1473).

Figure 5-96: *Prunus argentea* (Lam.) Rehd. 1. Habit. – 2. Branches. – 3. FruitsOther collections: above Darimarr, *Gillett 11880* (BAG, K); Tawella, *Rechinger 10346* (BUH, W).983. *Prunus armeniaca* L.

(Syn.: *Armeniaca vulgaris* Lam.)

(* , P, C, Fr, M, I, S, T): 11(23), 11(116), 11(1394).

Although apricot (Kaisi) is cultivated throughout Kurdistan, no collections were previously made from Hawraman.

984. *Prunus carduchorum* (Bornm.)Meikle.

(P, F, Fr, M, I, S, T): 11(1427), 12(359), 12(535),

985. *Prunus cerasifera* Ehrh.

(P, F, Fr, M, I, S, T): 11(1303), 11(1393).

Other collections: Ballkha near Tawella, *Rawi 21848* (BAG, K); Khurmall, *Rawi 8893* (BAG, K).

986. *Prunus kotschyi* (Boiss. & Hohen.) Meikle

(Syn.: *Amygdalus kotschyi* Boiss. & Hohen.)

(* , P, F, Fl, M, I, T): 11(603), 11(612).

987. *Prunus lycioides* (Spach) Schneid. (Fig. 5-98)

(Syn.: *Amygdalus lycioides* Spach).

(** , P, Vr, Fr, M, I): 11(267), 11(326).

Description: Shrubs spiny, much branched. Young branches glabrous, older branches gray to white or brownish gray. Leaves 2–3 cm × (2–)3–4(–5) mm, narrowly linear-lanceolate, apex acute, base decurrent, sessile, margin remotely crenate-dentate and glandular, glabrous, leathery. Flowers sessile; hypanthium to 5 mm, cylindrical, glabrous, not constricted at base. Fruits velvety, to 15 × 12 mm.

This is the first record of the species from Iraq. Zohary (1950) stated that it occurs in Iraq based on Haussknecht's note "in schistosis Nausud mountain Avraman". However, this locality is in Hawraman of Iran.



Figure 5-97: *Prunus lycioides* (Spach) Schneid. 1. Habit. – 2. Branches. – 3. Fruits

988. *Prunus mahleb* L. (Fig. 5-99)

(Syn.: *Cerasus mahaleb* (L.) Mill.)

(* , P, Vr, Fr, M, S, I, T): 12(769).



Figure 5-98; *Prunus mahaleb* L. 1- Habit. – 2. Branches

989. *Prunus microcarpa* C.A.Mey. var. *pubescens* (Bornm.) Meikle
(Fig. 5-100)

(Syn.: *Cerasus microcarpa* (C.A.Mey.) Boiss.).

(P, C, Fl, Fr, M, I, S, T): 11(169), 11(330), 11(521), 11(1336),
12(1496), 12(1589).

Other collections: near Tawella, *Rechinger 10176, 10286* (BUH, W);
above Darimarr, *Gillett 11859* (BAG, K).



Figure 5-99: *Prunus microcarpa* C.A. Mey. 1. Habit. – 2. Fruits

990. *Prunus webbii* (Spach) Vierh. (Fig. 5-101)

(Syn. *Amygdalus webbii* Spach)

(* , P, R, Fl, Fr, M, I, T): 11(603), 11(612), 11(1476), 12(644),
12(1084), 12(1347).



Figure 5-100: *Prunus webbii* (Spach) Vierh. 1. Habit. – 2. Branches. – 3. Flowers

Other collections: N of Biyara, *Gillett 11811* (BAG, K); above Darimarr, *Gillett 11856* (BAG, K).

991. *Pyrus malus* L.

(P, O, Fr, M, I, S, T): 11(1395).

Apple(K: Sêou) is widely cultivated in Kurdistan.

992. *Pyrus syriaca* Boiss.

(P, Fr, Fr, M, I, S, T): 11(328), 11(355), 11(831), 1423),

11(1472), 12(1476).

Other collections: Hawraman, *Hausknecht s.n.* (JE).

993. *Rosa canina* L.

(P, C, Fl, Fr, M, I, S, T): 11(305), 11(1191), 12(166), 12(211),

12(266), 12(976), 12(1524), 13(109).

Other collections: Tawella, *Rechinger 10244* (BUH, W); Hawraman, *Rawi et al. 19717, 19836* (BAG, K).

994. *Rosa elymaitica* Boiss. & Hausskn. (Fig. 5-102)

(P, R, Fl, M, I, T): 11(1338), 12(948).

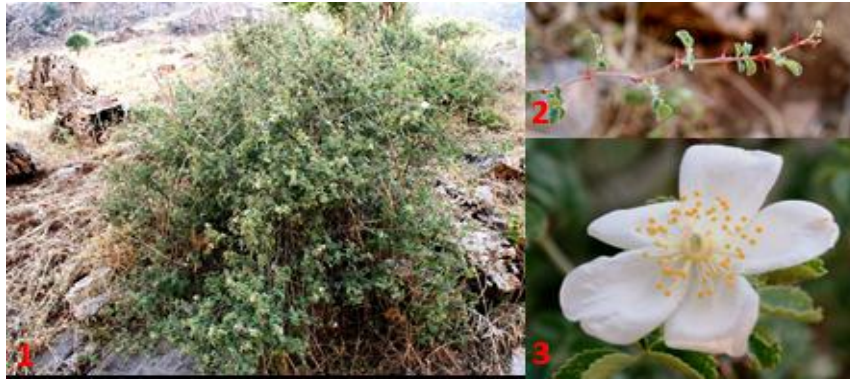


Figure 5-101: *Rosa elymaitica* Boiss. & Hausskn. 1. Habit. – 2. Branchs. – 3. Flower

Other collections: above Darimarr, *Gillett 11843* (BAG, K); near Tawella, *Rechinger 10314* (BUH, W).

995. *Rosa iberica* Stev.

(* , P, R, Fl, M, I, T): 12(699), 12(771).

996. *Rosa orientalis* Dupont ex Sér.

(P, F, Fl, Fr, M, I, S, T): 12(734), 12(7580), 12(1340).

Other collections: Hawraman, *Rawi et al. 29530* (BAG, K).

997. *Rosa* sp. 1

(P, Vr, Fr): 12(1524).

998. *Rosa* sp. 2

(P, R, Fl): 12(210).

Its cultivated species.

999. *Rubus anatolicus* (Focke) Focke ex Hausskn.

(P, F, Fl, Fr, M, I, S, T): 11(658), 11(1096), 11(1398), 12(847).

Other collections: Hawraman, *Rawi et al.* 19814 (BAG, K); Tawella, *Rawi* 22364 (BAG, K).

1000. *Rubus caesus* L. (Fig. 5-103)

(* , P, R, Fl, Fr, M, I, T): 11(270), 11(909), 11(1392), 12(1250).



Figure 5-102: *Rubus caesus* L. 1. Habit. – 2 Flowers. – 3 and 4. Fruits

74. Family RUBIACEAE

This family is represented in Hawraman by six genera and 26 species, of which five are new to Hawraman.

1001. *Asperula insignis* (Vatke) Ehrend. (Fig. 5-104)

(* , A, Vr, Fl, M, I, T): 12(151).



Figure 5-103: *Asperula insignis* (Vatke) Ehrend. 1. Habit. – 2. Leaves and stipules. – 3. Bract. – 4. Inflorescence. – 5. Flowers

1002. *Asperula setosa* Jaub. & Spach

(A, F, Fl, Fr, M, I, S, T): 12(427), 12(744).

Other collections: Kamaraspa, *Rawi* 22223 (BAG, K); near Tawella, *Rechinger* 12367 (BUH, W).

1003. *Callipeltis cucullaria* (L.) DC.

(A, F, Fl, Fr, M, I, S, T): 11(279), 12(215).

Other collections: Above Tawella, *Rechinger s.n.* (BUH, W); Khurmall, *Rawi* 8961 (BAG, K); Kamarspa, *Rawi* 22243 (BAG, K); Tawella, *Rawi* 21917 (BAG, K).

1004. *Callipeltis microstegia* Boiss.

(* , A, F, Fl, M, I): 11(241), 11(314), 1(467), (1052).

1005. *Crucianella gilanica* Trin. subsp. *carduchorum*
Ehrend. & Schönb.-Tem.

(P, F, Fl, Fr, M, I, T): 11(986), 12(727), 12(946), 12(1102),

12(1520).

Other collections: Zallm, *Rawi et al.* 29394 (BAG, K); near Tawella, *Rechinger* 10332 (BUH, W); N of Biyara, *Gillett* 11775 (BAG, K).

1006. *Crucianella parviflora* Ehrend.

(* , A, F, Fl, Fr, M, I, T): 11(1455), 11(1575), 12(814),

12(1048), 12(1593).

Other collections: N of Biyara, *Gillett* 11715 (BAG, K).

1007. *Crucianella* sp.

(A, F, Fr): 11(1488).

1008. *Cruciata taurica* (Pall. ex Willd.) Ehrend. subsp. *persica* (DC.) Ehrend.

(P, F, Fl, Fr, M, I, T): 11(1055), 12(764).

Other collections: near Tawella, *Rechinger 10341* (BUH, W); N of Halabja, *Rawi 22097* (BAG, K); Kamarspa, *Rawi 22201* (BAG, K); Dara Tri, *Rawi 22015* (BAG, K); 7 km W of Tawella, *Rawi 22330* (BAG, K); Tawella, *Rawi 22290* (BAG, K); Hawar Barza, *Rawi et al. 29516* (BAG, K).

1009. *Galium anguineum* Ehrend. & Schönb.-Tem.

Other collections: Hawraman, *Hausknecht s.n.* (JE).

1010. *Galium aparine* L

(A, F, Fl, Fr, M, I, S, T): 11(669), 11(883), 11(963), 12(409).

Other collections: Tawella, *Rawi 21977* (BAG, K).

1011. *Galium consanguineum* Boiss.

(* , P, O, Fl, M, I, T): 11(1574), 12(774), 12(940).

1012. *Galium hausknechtii* Ehrend.

(* , P, Fr, M, I?, T): 12(965).

Other collections: near Tawella, *Rechinger 12359* (BUH, W); N of Biyara, *Gillett 11798* (BAG, K); Kamarspa, *Rawi 22237* (BAG, K).

1013. *Galium kurdicum* Boiss. & Hoh.

(P, R, Fl, M, I, T): 12(795).

Other collections: Hawraman, *Gillett 11855* (BAG, K), *Rawi et al. 19764* (BAG, K).

This species is endemic to Kurdistan of Iraq, Iran, and Turkey.

1014. *Galium megalanthum* Boiss.

(P, F, Fl, Fr, M, I, T): 12(785), 12(991), 12(1064).

1015. *Galium mite* Boiss. & Hoh.

(P, F, Fl, M, I, T): 11(1225), 11(1241), 11(1459), 11(1493), 12(1106), 12(1290).

Other collections: Kamarspa, *Rawi 22244* (BAG, K); Tawella, *Rechinger 10359* (BUH, W).

1016. *Galium murale* (L.) All.

(A, F, Fr, M, I, T): 11(952), 12(1050).

1017. *Galium nirgicans* Boiss.

Other collections: Dara Tri, *Rawi 22029* (BAG, K).

1018. *Galium pseudokurdicum* (Ehrend.) Schonb.-Tem.

Other collections: Hawraman, *Rawi et al. 19775* (BAG, K); near Tawella, *Rechinger 10307* (BUH, W).

1019. *Galium psilocladum* Ehrend. & Schönb.-Tem.

(P, R, Fl, M, I, T): 12(629).

Other collections: NE of Halabja, *Gillett 11810* (BAG, K); Tawella, *Rechinger 10359* (BUH, W); Hawar Barza, *Rawi et al. 29337* (BAG, K).

1020. *Galium rivale* (Sm.) Griseb.

(P, F, Fl, Fr, M, I, T): 11(372), 11(409), 12(25).

1021. *Galium setaceum* Lam.

(A, F, Fl, Fr, M, I, S, T): 11(301), 12(218), 12(243).

Other collections: 10 km W of Tawella, *Rawi 22124* (BAG, K); Susakan, *Rechinger 10142* (BUH, W).

1022. *Galium spurium* L.

Other collections: Khurmall, *Rawi 8926* (BAG, K).

1023. *Galium tricornutum* Dandy

Other collections: Kani Spi, *Rawi 22402* (BAG, K).

1024. *Galium verum* L.

(* , P, F, Fl, M, I, S T): 11(355), 11(577), 11(534).

1025. *Galium* sp.

(P, R, Fl, Fr): 11(1574).

1026. *Sherardia arvensis* L.

(A, F, Fl, M, I, S, T): 11(408), 12(52).

Other collections; Halabja, *Rawi 8549-S* (BAG, K).

75. Family RUTACEAE

This family is represented in Hawraman by one genus and two species not previously recorded for the mountain.

1027. *Haplophyllum buxbaumii* (Poir.) G.Don

(* , P, R, F, M, I, T): 11(1226), 12(468), 12(882).

1028. *Haplophyllum tuberculatum* (Forssk.) Adr.Juss.

(* , P, F, Fl, M, I, S, T): 11(921).

76. Family SALICACEAE

This family is represented in Hawraman by two genera and five species, all of them are new to Hawraman. Treatment of the family follows Shahbaz (2009).

1029. *Populus alba* L.

(* , P, C, V, M, I, S, T): 11(808).

1030. *Populus euphratica* Oliv.

(* , P, F, V, I, S, T): 11(1408).

1031. *Salix acmophylla* Boiss.

(* , P, C, Fl, Fr, M, I, S, T): 11(646), 11(1379), 12(110), 12(1218).

1032. *Salix alba* L.

(* , P, F, Fr, M, I, S, T): 11(954), 11(1101), 12 (558).

1033. *Salix purpurea* L.

(* , P, R, V, I, T): 11(1269), 11(1378).

77. Family SANTALACEAE

The family is represented in Hawraman by one genus with one species.

1034. *Thesium kotschyannum* Boiss.

(P, R, Fl, Fr, M, I): 12(1124)

Other collections: above Darimarr, *Gillett 11876* (BAG, K); Hawraman, *Hausknecht s.n.* (JE).

78. Family SCROPHULARIACEAE

This family is represented in Hawraman by two genera and 22 species, of which three are new to Hawraman.

1035. *Scrophularia azerbaijanica* Grau

(P, O, Fl, Fr, M, I, T, S): 11(388), 11(762), 11(810), 11(1183),
11(1083), 12(129), 12(309), 12(554).

Other collections: Tawella near Susakan, *Rechinger 10191* (BUH).

1036. *Scrophularia catarifolia* Boiss. & Heldr.

(* , P, R, Fl, Fr, M, I, T): 12(973), 12(1129), 12(1389), 12(1523).

1037. *Scrophularia crenophila* Boiss. (Fig. 5-105)

(P, F, Fl, Fr, M, I, T): 12(861), 12(1446).

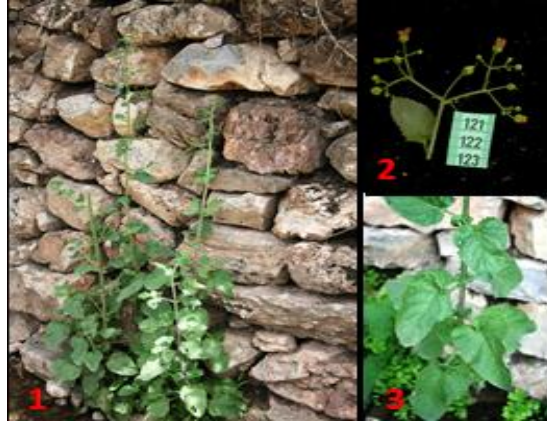


Figure 5-104: *Scrophularia crenophila* Boiss. 1. Habit. – 2. Portion of Inflorescence. – 3. Leaves

Other collections: Pushtashan near Tawella, *Rechinger 10156* (BUH), *Rawi and Serhang 26545* (BAG, K); Hawraman, *Gillett 11747* (BAG, K); Zallm, *Rawi 29415* (BAG, K).

1038. *Scrophularia deserti* Del.

(P, O, Fr, M, I, S, T): 11(1070), 11(1266), 12(554).

Other collections: Zallm, *Rawi et al. 29391* (BAG, K).

1039. *Scrophularia kurdica* Eig subsp. *Kurdica*

Other collections: Hawraman (without specific localities), *Rawi 19738, 19754, 19766* (BAG, K).

This species is represented in Hawraman by subsp. *kurdica*.

1040. *Scrophularia libanotica* Boiss.

Other collections: Hawraman, near Tawella, *Rawi 29347, 22212* (BAG, K), *Rechinger 10358* (BUH).

1041. *Scrophularia nervosa* Benth. subsp. *nervosa* (5-106)

This subspecies was collected only once by Hausskencht from Hawraman, and his voucher at JE was not available for this study. It differs from subsp. *boissierana* by having broad leaves to 4 cm that are regularly serrate. By contrast, subsp. *boissierana* has narrower leaves to 2 cm wide and are entire or remotely serrate-dentate.

(P, O, Fl, Fr, M, I): 11(539), 12(770), 12(1444).

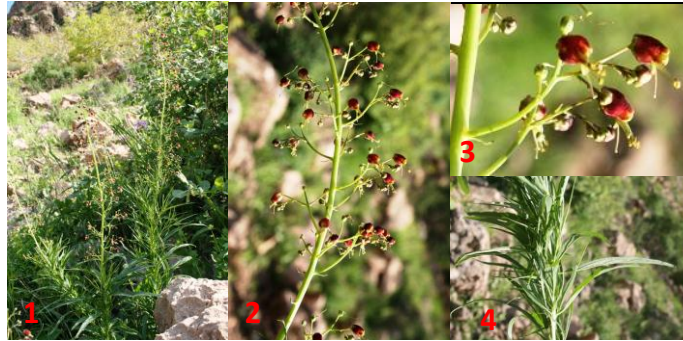


Figure 5-105: *Scrophularia nervosa* Benth. 1. Habit. – 2. Inflorescence. – 3. Flowers. – 4. Leaves

1042. *Scrophularia nervosa* subsp. *boissierana* (Jaub. & Spach) Grau

Other collections: Tawella, *Rechinger 10330* (BUH); Kamarspa, *Rawi 22184* (BAG, K).

1043. *Scrophularia pegaea* Hand-Mazz..

(P, O, Fl, Fr, M, I, T): 11(719), 11(1084), 11(1277), 12(448)

Other collections: Halabja, *Hadač et al. 2926* (BUH, PR); Seruan, *Hadač 2908* (BUH, PR).

1044. *Scrophularia pruinosa* Boiss.

(P, F, Fl, Fr, M, I, T): 11(1403), 12(696), 12(868).

Other collections: near Tawella, *Rechinger 10243, 10362, 12425* (BUH), *Rawi 22303* (BAG, K).

1045. *Scrophularia striata* Boiss.

(P, F, Fl, Fr, M, I, S, T): 11(388), 11(762), 12(129), 12(309).

Other collections: near Tawella, *Rechinger 10302* (BUH); *Rawi 21883* (BAG, K); 10 km W of Tawella, *Rawi 22122* (BAG, K); N of Halabja, *Rawi 22114* (BAG, K).

1046. *Scrophularia sulaimanica* S.A.Ahmad, sp. nov. TYPE: Iraq, Kurdistan, Sulaimani Province, between Darashesh and Hawar, eroded places by roadside, 1069 m, 35°11'13"N, 46°04'22"E, 16 June 2012, Saman A. Ahmad 12-320 (holotype, SUFA; isotypes, K, MO, SUFA).

(***, P, R, Fl, Fr): 12(320)

Herbs perennial, sparsely to densely glandular, not glaucous. Stems (50–)75–145 cm tall, several to many from woody caudex, erect to ascending, solid, terete or slightly angled, glabrous, glandular, branched below the thyrses. Basal leaves broadly lanceolate in outline, deeply incised to pinnatifid, 2–5 × 1–2.5 cm, sparsely to densely glandular; petioles 3.5–7 cm; middle and upper cauline leaves alternate, lanceolate, pinnatifid to deeply incised or coarsely dentate, petiolate, gradually reduced in size upwards and becoming dentate. Thyrses much branched, 35–85 cm; cymes 5–7-flowered, alternate, fewer flowered distally, sparsely glandular, peduncle 0.7–2 cm; lowermost bracts leafy, short petiolate, elliptic, 5–15 × 2–5 mm, becoming subulate-linear upwards, 3–6 × to 1 mm, and without scarious margin; bracteoles similar to distal bracts, smaller; flowering pedicels slender, 2–4 mm, substantially longer than subtending bracteoles; fruiting pedicels of central flower somewhat thick, angled, 4–6 mm, sparsely glandular or glabrous. Calyx lobes orbicular to broadly ovoid in fruit, 3–4

mm, glabrous, scarious margin undulate, lacerate, 0.8 –1.4 mm wide. Corolla urceolate, 6–7 mm, maroon; lateral lobes white margined; upper lip not margined, emarginate, 3–3.5 mm, lobes suborbicular; lower lip white; corolla tube white, ca. 3 mm; staminode subsessile, broadly ovoid, 0.8–1 mm, inserted at corolla throat, not reaching notch of upper lip; filaments of fertile stamens ca. 1.5 mm, glabrous; anthers 1–1.5 mm. Fruit globose, 2-lobed, 3.5–5 mm in diam., glabrous, apiculate; style 3.5–4 mm; seeds oblong, black, slightly curved, ca. 1.5 × 0.5 mm, scrobiculate.

Scrophularia sulaimanica, which is named after Sulaimani Province of Kurdistan Iraq, is somewhat closely related to the Iranian-endemic *S. valida* Grau and the Anatolian-Caucasian *S. thesioides* Boiss. From the former, it differs by having solid (vs. hollow) stems, glandular (vs. pruinose-canescens) cover, smaller (6–7 vs. ca. 8.5) and maroon (vs. brown with purplish veins) corolla, much smaller (0.8–1 vs. 2.5 mm) broadly ovoid (vs. elliptic) staminode substantially smaller than (vs. subequal to) upper corolla lip, and shorter (ca. 1.5 vs. 5.5 mm), glabrous (vs. hispidulous filaments). From *S. thesioides*, the new species differs by being glandular (vs. non-glandular), with terete (vs. narrowly winged) stems, lanceolate (vs. linear) upper leaves, larger (3–4 vs. 2–2.2 mm) sepals, broadly ovate (vs. narrowly oblong) staminodes, globose (vs. ovoid) fruits, and pedicels substantially longer (vs. much shorter) than pedicels.

Paratypes: Iraq, Kurdistan, Sulaimani Province, Lase Marf, between rocks, on cliffs, or eroded places, 1895 m, 35°19'20"N, 46°09'07"E, 16 June 2012, *Saman A. Ahmad 12-1077* (K, MO, SUFA).



Figure 5-106: *Scrophularia sulaimanica* S.A.Ahmad. 1. Habit. – 2. Portion of inflorescence. – 3. Flower

1047. *Scrophularia* sp.

(P, F, Fr): 11(1266)

1048. *Verbascum agrimoniifolium* (C.Koch) Hub.-Mor.

(B, F, Fl, Fr, M, I, S, T): 11(1075), 12(612), 12(706).

Other collections: Susakan near Tawella, *Rechinger 10170* (BUH).

1049. *Verbascum alceoides* Boiss & Hausskn.

(P, F, Fl, Fr, M, I): 11(294), 11(944), 12(390).

1050. *Verbascum calvum* Boiss. & Kotschy

(* , B, R, Fl, Fr, M, T): 11(1466).

This species is very rare in Kurdistan Iraq, where it grows in a restricted geographical area at 1600–1800 m and is represented by a small population with not more than 20 plants.

1051. *Verbascum macrocarpum* Boiss.

(P, F, Fl, Fr, M, I, T): 11(703), 12(753), 12(1374).

Other collections: near Tawella, *Rechinger 10260* (BUH).

1052. *Verbascum orientale* (L.) All.

(* , R, Fl, M, I, S, T): 11(250).

1053. *Verbascum palmyrense* Post

(* , B or P, O, Fl, Fr, M, S): 12(1621).

1054. *Verbascum pseudodigitalis* Náb.

(P, F, Fl, Fr, M, I): 12(623), 12(842).

Other collections: near Tawella, *Rechinger 10241* (BUH).

1055. *Verbascum* sp.1

(P, R, Fl): 11(532), 12(339).

1056. *Verbascum* sp. 2

(P, R, Fl): 12(813).

79. Family SIMAROUBACEAE

This family is represented in Hawraman and Kurdistan Iraq by one genus and one species.

1057. *Ailanthus altissima* (Mill.) Swingle J. Wash. Acad. Sci. (Fig. 5-108)

(* , P, Vr, Fl): 11(918).

Habitat: grows in wet places between Walnut trees

Distribution: Native of eastern and central Asia; introduced in Kurdistan Iraq and very rare in Hawraman. There are few trees in a small population in Shekh Osman's house in Biayara.



Figure 5-107: *Ailanthus altissima* (Mill.) Swingle. 1. Habit. – 2. Branch. – 3. male flowers

80. Family SOLANACEAE

This family is represented in Hawraman by four genera and seven species, of which six have not been previously reported for the mountain.

1058. *Datura stramonium* L.

(* , P, O, Fr, M, I, S, T): 11(25).

1059. *Hyoscyamus niger* L.

(* , A or B, O, Fl, Fr, M, I, T): 11(714), 11(1415), 12(415).

1060. *Hyoscyamus reticulatus* L.

(* , B, R, Fl, Fr, M, I, T): 12(1126).

1061. *Physalis alkekengi* L.

(* , P, R, Fr, M, I, T): 11(1297), 11(1319), 11(1515).

1062. *Physalis divaricata* D.Don

(* , A, F, Fl, Fr, M, I, T): 12(830), 12(1458), 12(1617).

1063. *Solanum luteum* Mill.

(* , A, F, Fl, Fr, M, I, T): 11(1296), 11(1397).

1064. *Solanum persicum* Willd. ex Roemer & Schultes

(A, F, Fl, Fr, M, I, T): 12(1620).

Other collections: Shaikh [Saiyid] Sadik, *Haines s.n.* (BUH, K).

81. Family TAMARICACEAE

This family is represented in Hawraman by one genus and one species.

1065. *Tamarix ramosissima* Ledeb.

(P, F, Fl, M, I): 11(665), 11(1365), 12(1613).

Other collections: Hawraman, *Rawi et al. 19812* (BAG, K).

82. Family THYMELAEACEAE

This family is represented in Hawraman by one genus and one species.

1066. *Daphne mucronata* Royle

(P, C, Fl, Fr, M, I, T): 11(594), 11(1021), 11(1218),

12(1140), 12(1157), 12(1309), 12(1424).

Other collections: Hawraman, *Rechinger 10324* (BUH, W), *Haussknecht s.n.* (JE); Hawar Barza, *Rawi et al. 29503* (BAG, K).

83. Family TYPHACEAE

This family is represented in Hawraman by two genera and two species, one new to Hawraman.

1067. *Sparganium erectum* L. var. *oocarpum* (Celak.) Schinz & Thell. (Fig. 5-109)

(P, R, Fl, Fr, M): 11(1166).

Other collections: between Saiyid Sadik and Halabja, *Agnew et al.1840* (BUH).



Figure 5-108: *Sparganium erectum* L. var. *oocarpum* (Celak.) Schinz & Thell.

This is a very rare species in Hawraman, and Kurdistan Iraq. It grows on muddy banks of Zallm River.

1068. *Typha lugdunensis* Chab. ex Ser.

(* , P, C, Fl, M, I, T): 11(1141), 12(1175).

84. Family ULMACEAE

This family is represented in Hawraman by two genera and three species, of which two are new to Hawraman.

1069. *Celtis australis* L.

(P, F, Fl, Fr, M, I, S, T): 11(1339), 11(1354), 11(1463), 12(362),

12(1079).

Other collections: Tawella, *Rawi 21889* (BAG, K), *Rechinger 10305* (BUH, W); N of Biyara, *Gillett 11817* (BAG, K).

1070. *Celtis tournefortii* Lam. (Fig. 5-110)

(* , P, F, V, M, S, T): 11(916), 11(1287).



Figure 5-109: *Celtis tournefortii* Lam. 1. Habit. – 2. Smooth bark. – 3. Fruits

1071. *Ulmus androssowii* Litw.

(* , P, R, V, M, I, T): 11(1098), 11(1314).

85. Family URTICACEAE

This family is represented in Hawraman by two genera and four species, of which one is new to Hawraman.

1072. *Parietaria alsinifolia* Del.

(* , A, R, Fl, M, I, S T): 12(430).

1073. *Parietaria judaica* L.

(P, F, Fl, Fr, M, I, S, T): 11(725), 12(731), 12(844), 12(1338).

Other collections: W slope of Hawraman, *Gillett 11835* (BAG, K).

1074. *Parietaria lusitanica* L.

(A, F, Fl, M, I, S, T): 11(287), 11(454).

Other collections: Tawella, *Rawi 21892* (BAG, K), *Rechinger 10839* (BUH, W); Khurmall, *Hadač 5030* (BUH, PR).

1075. *Urtica dioica* L.

(P, C, Fl, Fr, M, I, S, T): 11(1271), 11(1381), 12(963).

Other collections: near Tawella, *Rawi et al.* 29587 (BAG, K).

86. Family VERBENACEAE

This family is represented in Hawraman by one genus and one species.

1076. *Verbena officinalis* L.

(P, C, Fl, Fr, M, I, S, T): 11(1087), 11(1280), 11(1384), 12(1249).

Other collections: Halabja, *Guest* 12928 (BAG, K); Zallm, *Rawi et al.* 29490 (BAG, K); Ballkha, *Rawi* 22352 (BAG, K).

87. Family VIOLACEAE

This family is represented in Hawraman by one genus and two species.

1077. *Viola modesta* Fenzl

(A, C, Fl, M, I, S, T): 11(364), 11(588), 11(1045).

Other collections: Kamarspa, *Rawi* 22267 (BAG, K); Dara Tri, *Rawi* 22005 (BAG, K); Tawella, 12449 (BUH, W).

1078. *Viola odorata* L.

(P, F, Fl, Fr, M, I, T): 11(21), 11(1299).

Other collections: Susakan; *Rechinger* 10159 (BUH, W).

88. Family VITACEAE

This family is represented in Hawraman by two genera and four species, of which one is new to Hawraman.

1079. *Parthenocissus quinquefolia* (L.) Planch.

(* , P, R, Fr, I, T, S): 11(1352).

1080. *Vitis hissarica* Vass. subsp. *rechingeri* Vass.

(P, F, Fl, M, I, S, T): 11(881), 11(889).

This subspecies is endemic to Kurdistan Iraq.

Other collections: Ballkha, 7 km W of Tawella, *Rawi 21844* (BAG, K); Tawella, *Rechinger 10212* (BUH, W).

1081. *Vitis vinifera* L.

(P, C, V, M, I, S, T): 11(504), 11(1090), 11(1315).

1082. *Vitis* sp.

(P, Vr, V): 11(1131).

89. Family XANTHORRHOEACEAE

This family is represented in Hawraman by one genus and one species new to the mountain.

183. *Eremurus cappadocicus* M.Bieb. (fig. 5-13)

(* , Vr, Fr, M): 12(982).



Figure 5-110: *Eremurus cappadocicus* M.Bieb. 1. Habit. – 2. Inflorescence. – 3. Fruit 4. Roots

It is very rare species in Hawraman, where it grows near timberline and subalpine zone between 1750–2100 m.

90. Family ZYGOPHYLLACEAE

This family is represented in Hawraman by one genus and one species not previously reported for the mountain.

1084. *Tribulus terrestris* L.

(* , A, F, Fl, M, I, S, T): 12(909), 12(1196).

Summary of the results

1. Number of families 90 (15 new to Hawraman).
2. Number of taxa 1,140 (426 new to Hawraman).
3. Number of species new to Iraq 19.
4. Number of species new to science FOUR.
5. Largest families (40 or more taxa)

	Family	Total Number of Taxa
1	ASTERACEAE	134
2	FABACEAE	100
3	POACEAE	81
4	LAMIACEAE	67
5	BRASSICACEAE	63
6	APIACEAE	60
7	CARYOPHYLLACEAE	55
8	ROSACEAE	41
9	BORAGINACEAE	40
	TOTAL	641

6. Medium families (11–39 taxa): 13 families, 235 taxa.

7. Small families (1–10 taxa): 67 families, 264 taxa.

6. CHAPTER SIX

Vegetation zones in Hawraman

Although it may sometimes be difficult to decide where to draw the boundary between one zone of plant vegetation and another, we can nevertheless distinguish four vegetation zones in Hawraman.

6.1 Moist steppe zone

This zone runs across the upper plains in Sharazoor land near Darbandikhan Lake toward the foothills between Dereshish in the south and Hane Khulla foothills above Khurmall. This zone is about 264 km² and occupies 44% of the total Hawraman area at elevations between 450–700 m. The main habitats of this zone are:

A. Steppe non-irrigation fields dominated by *Poa bulbosa* and *Aegilops umbellulata* (grasses), *Centaurea iberica*, *Cichorium intybus* and *Sinapis arvensis* (herbs).

B. Steppe irrigation fields dominated by *Hordeum* spp. and *Imperata cylindrica* (grasses), *Prosopis farcta*, and *Glycyrrhiza glabra* (Fabaceae, subshrubs).

C. The foothills dominated by *Anemone coronaria*, *Gundelia tournefortii*, and *Papaver* spp. (herbs); *Pistacia* spp., *Capparis spinosa*, and *Prunus arabica* (shrubs) (Fig. 6-1).



Figure 6-1: Moist steppe zone- foothills, dominant species here is *Gundelia tournefortii*

D. Riverian forest of the plains: This is represented by Zallm River in Hawraman area, and dominated by *Salix acmophylla*, *Phragmites australis* and *Rubus anatolicus* (Fig. 6-2).



Figure 6-2: Riverian forest of the plains, dominant species here is *Salix acmophylla*

E. Submerged river or canal vegetation: These areas are dominated by *Potamogeton nodosus* and *Ranunculus sphaerospermus* (Ararat, 2010) (Fig. 6-3).



Figure 6-3: Submerged river or canal vegetation

6.2 Forest zone

The lower limits of this zone are generally about 650 m near Ababeile Village in Shnirwe Mountain from its southern part to above Zallm Village at the northern parts. The higher limits reaches 1750 m, and the total area of this zone is about 322 km², or 48% of the total Hawraman area. The characteristic vegetation of the forest zone is oak trees. Hawraman forests can be classified based on the following habitats or vegetations:

A. Oak forests: The dominant species are *Quercus aegilops*, *Q. infectoria*, and *Q. libani* (Fig. 6-4) in association with some other trees and shrubs such as *Acer monspessulanum*, *Crataegus azarolus*, *Prunus microcarpa*, and *Rhamnus kurdica*.



Figure 6-4: Oak Forests dominated with *Quercus aegilops* and *Q. infectoria*

B. Mountain Riverian Forests: This is commonly found alongside mountain streams and are dominated by *Populus euphratica*, *Populus alba*, *Salix acmophylla*, *Platanus orientalis*, and *Fraxinus syriaca* (Fig. 6-5) in association with some other species such as *Paliurus spina-christi*, *Mentha longifolia*, *Lythrum salicaria*, and *Epilobium hirsutum*.



Figure 6-5: Mountain Riverian Forest in Ahmad Awa, the dominant species are *Platanus orientalis* and *Fraxinus syriaca*

C. Mountain Riverian Walnut Forests: These are commonly found alongside mountain valleys in Hawraman, especially between Biyara and Tawella. They are dominated by *Juglans regia* (Fig. 6-6) in association with some other trees such as *Morus alba*, *M. nigra*, and *Ficus carica*, along with cultivated species such as *Prunus amygdalus*, *P. armeniaca*, *P. cerasifera*.



Figure 6-6: Mountain Riverian Walnut Forest, the dominant species here is *Juglans regia*

The herbaceous layer of the forest zone is comparatively rich in species while the number of trees is limited. The dominant herbs are *Achillea allepica*, *Carthamus oxyacanthus*, *Echinops chardinii*, *Picris strigosa*, *Pisum sativum*, *Vicia tenuifolia*, and *Ferulago macrocarpa*, along with some common grasses such as *Aegilops triuncialis*, *Avena wiestii*, *Hordeum glaucum*, *Poa bulbosa*, and *Taeniatherum crinitum*.

Most of the mountainside and foothills between Biyara and Awesar are covered by vineyards, and the common cultivated species is *Vitis vinifera* (Fig. 6-7). Until today, most of the old oak trees growing in cemeteries of Hawraman region are kept unharmed as a cultural habit of the Kurdish people who respect graveyards.



Figure 6-7: Vineyards between Ballkha and Susakan, the dominant species is *Vitis vinifera*

6.3 Timberline zone

This is a narrow transitional belt starting from 1750 to 1850 m and occupying about 18 km², or 3% of the total area of Hawraman (Fig. 6-8:1). This zone has a very specific vegetation type connecting the forest zone and the subalpine zone and dominated by *Daphne mucronata*, *Lonicera arborea*, *Prunus kotschyi*, *P. webbii*, and *Astragalus tortuosus*, in association with some herbs such as *Hymenocarpus circinnatus*, *Rheum ribes*, *Ferulago angulata*, and *Hypericum scabrum* (Fig. 6-8:2).



Figure 6-8: Timberline zone. 1. The dominant species here are *Daphne mucronata* and *Lonicera arborea*. – 2. The dominant species is *Hypericum scabrum*.

6.4 Thorn-cushion or subalpine zone

This is the highest phytogeographical zone in Hawraman. It is a discontinuous zone starting from 1850 to 2598 m in Hane Newa Peak and occupying about 24 km², or about 4% of the Hawraman total. The zone is dominated by the tragacanthic *Astragalus microcephalus* and *A. rhodochorus*, together with *Prunus argentea*, *Acantholimon caryophyllaceum*, *A. latifolium*, *Asyneuma pulchellum*, and *Noaea mucronata*.

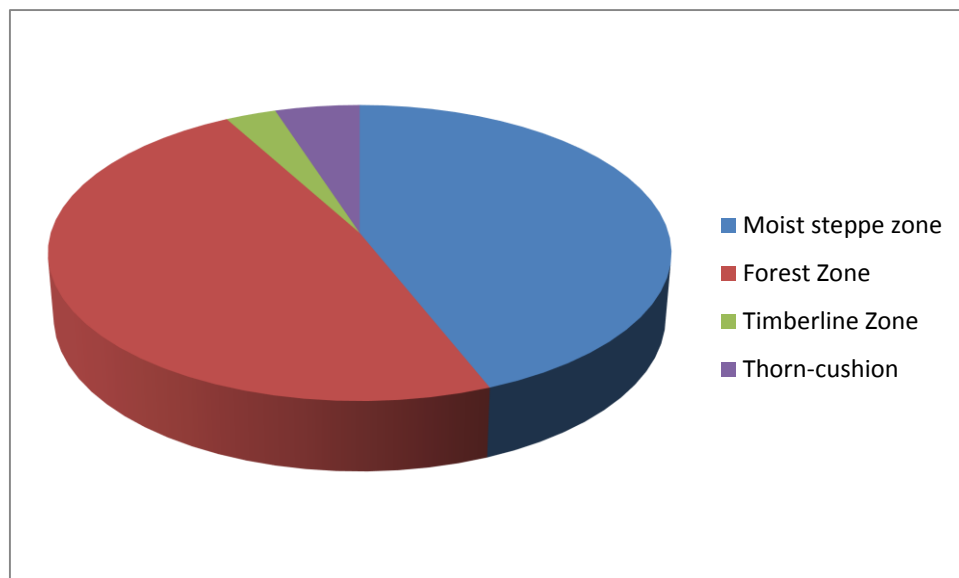


Figure 6-9: The ratio of vegetation zones in Hawraman region

7. CHAPTER SEVEN ETHNOBOTANY

Ethnobotanical studies aim at documenting, describing, and explaining complex relationships between cultures and uses of plants, as well as focusing primarily on how plants are used, managed, and perceived across human societies. This includes the use for food, clothing, medicine, dye, horticulture, construction, etc.

The traditional use of local plants in the Hawraman area has a long history, and the people there use plants for many purposes such as medicine, food, ornamental, housing, and others

The economically important plants of Hawraman are arranged alphabetically by families, genera, and species. Under each entry, the scientific name is followed in parenthesis by its name in Kurdish (K) and English (E). All economic values of the plants are summarized in Table 7.1 at the end of the chapter.

1. Family ACERACEAE

1. *Acer monspessulanum* L. (K: kawit; E: maple)

Smooth and fine grains of the wood when cut into plates with heavy textures are very suitable for preparation of many household utensils such as:

A. Pina “Durxona” used for spreading dough in preparing traditional Kurdish bread K: nani Hawrami and K: nani Teeri.

B. Tablespoon and large spoon (Fig. 7-1: 1) for drinking yogurt-water (K: mastaw).

C. Two-sided comb with fine and course teeth (K: shana) (Fig.7-1: 2).

D. Smoking pipe (K: qulda)



Figure 7-1: 1. Spoons for sale in Tawella bazar – 2. Two-sided comb for sale in Tawella bazar

2. Family ALLIACEAE

2. *Allium akaka* Gmelin (K: lucha; E: onion)

The leaves and bulbs of this plant are chopped and mixed with eggs to make a special type of omlet.

3. Family ANACARDIACEAE

3. *Pistacia eurycarpa* Yalt. (K: daraban; E: pistachio)

This species is commercially very important and various parts of the plant are used as the following:

A. The stems exudate a bitter gum (K: bneshtatall) which is produced by injuring the stem and freshly collected without treatment as gum for treating gastrointestinal problems or mixed with fine shreds of soap made from pistacia oil and used as a dressing to clean old wounds or to erupt boils.

B. Local chewing gum (K: bnesht) is made from bneshtatall by boiling with water. Upon cooling, the water-soluble compounds are

discarded and the water-insoluble residue is used as a chewing gum. (Fig. 7-2: 1)

C. Fresh unripe fruits are used in late spring as a condiment and eaten fresh (Fig. 7-2: 2). The dried fruits are used as a condiment mixed with yogurt (Fig. 7-2: 3). A tea made from the dried fruit is used as antidiarrheal medicine.

D. The dry ripe fruits are bored from two sides and converted into necklaces and worry beads (K: tazbeh) (Fig. 7-2: 4, 5, and 6).



Figure 7-2: Local chewing gum. – 2 and 3. Dry ripe fruits. – 4. Tazbeh. – 5, 6. Tazbeh for sale in a Sulaimani bazar

4. *Rhus coriaria* L. (K: trsha sumaq, smaq; E: sumac) (Fig 7-3)

The seeds and fruits are used as flavours in different traditional dishes



Figure 7-3: Smaq for sale in a Tawella bazar

4. Family APIACEAE

5. *Ammi majus* L. (K: ddan pakkarawa; E: Bishop's weed) (Fig. 7-4).

The mature and dried compound umbels become a bundle, and the primary rays of the umbel are used as toothpicks. The fine texture of the fibers and the presence of phenolic compounds in the infructescence act as antiseptics, imparts a property of a fine and healthy toothpick available.



Figure 7-4: The mature and dried umbels

6. *Anethum graveolens* L. (K: raziana; E: Lao coriander)

The seeds are used in preparing many types of sweets and as a fine carminative.

7. *Ferulago abbreviata* C.C.Towns. (K: chnur).

The leaves of the plant are used as a deodorant to abolish foot smell by preventing the growth of organisms that cause the smell. The prosses is to put few crushed dried or fresh leaves inside the food-wear.

8. *Ferulago angulata* (Schlecht.) Boiss. (K: low) (Fig. 7-5)

The aboveground parts of plant are harvested when still green dried under the sun, and piled for use in the winter as hay (K: Gzra). Increase milk production of ruminants. Also, due to its content of volatile oils, the dried plants are used as fire starter when the wood is wet.



Figure 7-5: Gzra made from *Ferulago angulata* (Schlecht.) Boiss. near Tawella village

9. *Hellenocarum amplifolium* Boiss. & Hausskn.

Young basal leaves used as a vegetable (K: Parraza)



Figure 7-8: Basal leaves of *Hellenocarum amplifolium* (Boiss. & Hausskn.) for sale in Khurmall bazar.

5. Family ARACEAE

10. *Arum italicum* Mill. (K: kardw; E: Italian arum) Fig. 7-6)

The leaves of this species are used in preparing two types of special traditional dishes. In the first step of preparation, the leaves are treated with sumaq to remove the toxic glycosides by converting them into water-soluble material. After straining, the leaves are used either in the preparation of dolma (a Middle Eastern dish) or chopped and mixed with eggs to prepare a special omelet.



Figure 7-6: Arum leaves for sale in Khurmall bazar

6. Family ASTERACEAE

11. *Arctium lappa* L. (E: greater burdock)

The leaves and roots of the plant are boiled. After straining, the liquid is drunk for the treatment of gastrointestinal problems and chest pain.

12. *Artemisia haussknechtii* Boiss. (K: barzaling)

The leaves, flowers, fruits, and seeds of the plant are boiled. After straining, the liquid is drunk for the treatment of diabetes, weight losing, and as a carminative.

13. *Bellis perennis* L. (E: lawn daisy)

This species is locally used as an ornamental plant.

14. *Gundelia tournefortii* L. (K: qnger)

This plant is commercially very important, and various parts are used as following:

A. The underground scale leaves are eaten either as fresh vegetable or boiled or mixed with eggs and onion and fried to produce a Kurdish dish (K: kinger kabab or kinger masie).

B. The fresh tender peeled stems are eaten as a fresh vegetable (K: cechirmax) (Fig. 7-7).

C. The mature dried fruits are roasted and used as nuts.

D. The whole aboveground parts of the mature plant when still green are cut, dried, and crushed into course pieces and used as a fodder for animals.



Figure 7-7: Fresh tender stems of *Gundelia tournefortii* for sale in a Halabja bazar.

15. *Notobasis syriaca* (L.) Cass. (K: chawbaza; E: Syrian thistle)

The tender stems are used as a raw vegetable.

16. *Scorzonera* spp. (K: gulla bahara)

The fleshy root base are eaten fresh as a vegetable.

17. *Silybum marianum* L. (K: chawbaza; E: milk thistle)

The tender stems are used as a raw vegetable.

18. *Tragopogon longirostris* Bisch. (K: shing).

The roots and basal parts of the stem are freshly eaten as aphrodisiac.

7. BERBERIDACEAE

19. *Bongardia chrysogonum* (L.) Spach (K: Gablla)

The young plants in the seedling stage is chopped and mixed with agge to make a special type of omlet.

8. Family BORAGINACEAE

20. *Anchusa italica* Retz. (K: gozrwan) (Fig 7-8)

The rosette leaves are boiled and mixed with eggs and flavored with sumaq and eaten as omlet.



Figure 7-8: Basal rosette leaves of *Anchusa italica* Retz. (K: gozrwan) for sale in Khurmall bazar

9. Family FABACEAE

21. *Astragalus* sp. (K: katera or gawan; E: milk vetch) (Fig. 7:9)

Several species are used as a source of gum tragacanth. Until about 50 years ago, this product was sold in the markets of many parts of Kurdistan.



Figure 7-9: Preparig the gum by Local in Bafri Mere Mountain

22. *Cicer arietinum* L. (K: nok; E: chickpea).

This crop is cultivated in many parts of Kurdistan in the moist steppe zones. The seeds of chickpea are used in many local dishes, and the fresh unripe seeds are eaten roasted. The species also grows wild in many parts of Kurdistan.

23. *Lathyrus annuus* L. (K: Pollka)

The seeds are eaten fresh.

24. *Lens culinare* Medik. (K: Niesk; E: lentil)

The species grows in the wild in Kurdistan, and the seeds are used in soups and various dishes.

25. *Pisum sativum* L. (K: Pollka khatuna)

The fruits and seeds are freshly eaten. The species also grows as wild plant in many parts of Kurdistan.

10. Family FAGACEAE

26. *Quercus infectoria* Oliv. and *Q. aegilops* L. (K: dar baroo, mazo, or mazi; E: oak)

In the mountainous parts of Kurdistan, including Hawraman, oak trees have multi-purpose uses by the locals. The following are some ethnobotanical uses:

A. Young branches of oak thickets (K: shakhal) are cut and kept in piles between two close trunks of oak trees under a heavy pile of stones until winter, or kept between the branches of an oak tree (K: gull) (Fig. 7:10). When grazing lands are covered with snow, the branches with dry green leaves are used as a fodder, especially for sheep and goat. The naked branches are then used to build fire.



Figure 7-10: Gull kept in piles between two close branches of oak trees

- B. The trunks and thick branches are used as fire wood.
- C. Thick and straight branches are used in roofs of the traditional housing.
- D. The fruit cups of acorn (K: gawit) are used as the source of tannin for many purposes of leather preparations.
- E. Nutgalls (K: mazo, maze) are used as the source of tannins including its use in many local medicinal preparations.
- F. The fruits of *Quercus aegilops* are sold in the local markets and roasted and eaten in winter.

11. Family IRIDACEAE

27. *Iris aucheri* L. (K: Iris)

This is an ornamental plant.

28. *Iris germanica* L. (fig. 7-11).

This is an ornamental plant.



Figure 7-11: *Iris germanica* L. in a house garden

29. *Iris reticulata* M.Bieb.

A tea prepared from fresh or dry bulbs is used to cure tonsillitis.

12. Family JUGLANDACEAE

30. *Juglans regia* L. (K: guez; E: walnut):

This is the most important commercial plant used by people in Hawraman, who are famous for its cultivation.

A. The green outer of fruit while walls(exocarp) are macerated in water, and the aqueous parts is used for dyeing local textile. The final color will become permanent dark brown.

B. The bark of fully grown walnut tree is peeled and dried. Pieces of the dry bark (Arabic name derum) is soaked in water and used as lipstick by the bedwines and village women of southern Iraq. As a result of Kurdistan's destruction by soldiers of the previous regime, many walnut orchards died by peeling the fine green bark to prepare derum.

C. The hardwood is used for the preparation of furniture, doors, and windows.

D. Making special tool (K: terok) used for spreading dough over pina in the preparation of local bread, (Fig 7-12: 1).

E. Making special tools (K: blwer; Fig. 7-12: 2).used for children to drain urine when the child is put in to sleep in local traditional cradle (K: lanka).

F. The seeds are edible and used worldwide in a variety of cousine.



Figure 7-12 : 1. Terok. – 2. Blwer.

13. Family LAMIACEAE

30. *Hymenocrater longiflorus* Benth. (K: surahallalla)

The aboveground parts of the plant dried in the shade are boiled with water and used as a compress against scorpion stings.

31. *Melissa officinalis* L. (K: hallall perazenana; E: lemon balm)

The leaves are used for the preparation of dolma in the Hawraman area.

32. *Mentha longifolia* (L.) Hudson (K: Poungga).

The dried leaves are used as a herb in flavoring local dishes and also used as a powder and putting on the boiling been(K: paqlae kullaow).

33. ***Prunella vulgaris*** L. (E. common self-heal or heal-all)

A tea made from the upper parts of the plant is used in the treatment of cold and asthma.

34. ***Satureja laxiflora*** C. Koch (K: hezba):

The dried leaves are used as a herb in flavoring local dishes.

14. Family LILIACEAE

36. ***Fritillaria imperialis*** L. (K: shler; E: Crown imperial or Kaiser's crown)

This plant is ornamental and one of the most endangered species in Kurdistan because it is heavily collected by the locals.

15. Family LYTHRACEAE

37. ***Punica granatum*** L. (K: anar; E: pomgranate)

In addition to eating the juicy seeds, the rind is used as a tanning material for leather. The pomegranate syrup (K: rubahanar) is prepared from ripe seeds and used as salad dressing and in many food preparations, including marination of meat for shesh k̄āb̄āb and preparation of fruit juice. (Fig. 7-13)



Figure 7-13: Pomegranate syrup for sale in Tawella bazar

16. Family MALVACEAE

38. *Malva* spp. (K: tollaka)

The aboveground fresh parts of the plant are used as:

- A. chopped and boiled with water and used totally to alleviate problem of constipation.
- B. The chopped and boiled parts are mixed with eggs and fried to prepare a traditional dish.

17. Family MORACEAE

39. *Ficus carica* L. (K: hanjer; E: fig)

The fruits are eaten fresh or dried. The dried fruits are soaked in warm water and eaten to cure constipation

40. *Morus alba* L. (K: twa spee; E: white mulberry)

The fruits are eaten fresh (Fig.7-14: 1) or dried (Fig. 7-14: 2). The Mulberry syrup (K: doshaw-e-two) is prepared from dried mulberry fruits. Also, soaked dried fruits are consumed for the treatment of constipation.



Figure 7-14: *Morus alba* L. Fresh fruits for sale in a Sulaimani bazar. – 2. Dried fruit

41. ***Morus nigra*** L. (K: twa rasha; E: black mulberry):

The ripe black fruits are eaten fresh.

18. Family OLEACEAE

42. ***Fraxinus syriaca*** Boiss. (K: bnaw; E: ash):

The young branches are used for making cane (K: gochān)(7-15).



Figure 7-15: Cane of *Fraxinus* spp. for sale in a Halabja bazar

19. Family PLANTAGINACEAE

43. ***Plantago lanceolata*** L. and ***P. major*** L. (K: ragakesha, guebarkha; E: plantain)

The leaves are compacted together and used as a compress to alleviate the pain associated with rheumatism and bruises.

20. Family PLATANACEAE

44. *Platanus orientalis* L. (K: swra chnar; E: oriental plane)

After cutting, peeling, and drying, the trunk is used as the main beam in, the roof of the local housing construction in Hawraman.

21. Family POACEAE

45. *Imperata cylindrica* (L.) P.Beauv.

As perhaps in many parts of Iraq, the very young inflorescences are eaten fresh.

46. *Phalaris arundinacea* L. (K: zhazh; E: gardener's-garters)

During its flowering period, the locals collect and use the plant as forage.

47. *Phragmites australis* (Cav.) Trin. ex Steud. (K: qamish; E: Reed, cane)

It is used in many aspect of traditional way of living in Kurdish villages as follows:

A. Flute (K: blewer) is made of selected ripe stem of cane and is one of the folkloric Kurdish musical instruments.

B. Building purposes 1. Fence (K: taeman) the dried ripe stems are used in constricting a dry fence or a partition inside the house. 2. Roof cover in the traditional countryside housing in many villages.

48. *Triticum* spp. (K: ganme sawar; E, wheat) (Fig. 7-16)

Wheat spikes in the milky stage are mixed with hay and set on fire. After roasting, the kernels are dried and crushed and later used like rice for

preparation of a special dish called qarakharman. Several wheat species are cultivated throughout Kurdistan for making flour.



Figure 7-16: Roasting the spike and kernels in the field

22. Family POLYGONACEAE

49. *Rumex crispus* L. (K: trshoka; E: curly dock, yellow dock)

The fresh leaves are eaten raw or used for preparing traditional dish (dolma).

50. *Rheum ribes* L. (K: rewass; E: rhubarb)

The young petioles are peeled and eaten raw as a fresh vegetable (Fig. 7-17).



Figure 7-17: *Rheum ribes* L. for sale in Khurmali bazar

23. Family PORTULACACEAE

51. *Portulaca oleracea* L. (K: Pallpena; E: Common Purslane or pigweed) (Fig. 7-18)

The above ground parts are used as a fresh vegetable or mixed with lentil to prepare a special soup (Pallpena Batrsh).



Figure 7-18: *Portulaca oleracea* L. for sale in Sulaimani bazar

24. Family ROSACEAE

52. *Crataegus monogyna* Jacq. and *C. azarolus* L. (K: goezh; E: hawthorn, thornapple, or hawberry) (Fig. 7-19)

One of the wild edible fruits in Hawraman and Kurdistan.



Figure 7-19: *Crataegus* spp. for sale in a Sulaimani bazar

53. *Prunus amygdalus* Batsch. (K: badam, chwala; E: almond)

The unripe fruits are eaten fresh before becoming bitter. It is claimed to be useful for weight loss and hypotensive agent. The plants are commercially grown for their edible seeds (raw, salted, roasted), and for the production (in Europe and North America) of almond oil.

54. *Prunus domestica* (K: Hallozha; E: prunes) (Fig. 7:20) and *P. armeniaca* (K: Qaese; E: apricot)

When abundant as fresh, many fruits in Hawraman and the other parts of Kurdistan are dried for winter eating or for local dishes.



Figure 7-20: *Prunus domestica* L. putted on the traditional roof for drying

55. *Prunus microcarpa* (C.A.Mey.) Boiss. (K: ballaluk):

One of the edible wild fruit used as a delicacy. The ripe seed when crushed and eaten causes severe diarrhea, and small amount of it is used to prevent constipation. The young braches are used for making cane. Tazbeh (worry bead) is made from the endocarp (inner fruit wall) (Fig. 7-21).



Figure 7-21: *Prunus microcarpa* (C.A.Mey.) Boiss. 1. Fresh frutis. – 2. Canes. – 3. Tazbeh

56. *Rubus* spp. (K: tutrik; E: raspberry)

One of the common edible wild fruits of Kurdistan. The species grow in valleys with plenty of moisture and form a dense vegetation. The underground parts are cleaned and chopped to prepare tea of it is used for alleviating intestinal cramps.

57. *Rosa canina* L. (K: shelan; E: dog rose)

Tea made of rose petals and rosehip is used as hypotensive and a weight-loss medication.

25. Family RHAMNACEAE

58. *Paliurus spina-christi* Mill (K: zee; E: Jerusalem thorn)

The branches are burned and a greasy product is excreted at the other end and used for treatment of skin eczema.

26. Family SALICACEAE

59. *Populus alba* L. (K: spe chnar; E: abele or white poplar) (Fig. 7-22)

The dry peeled stems are used in the construction of roofs of traditional houses in Hawraman and the rest of Kurdistan.



Figure 7-22: Preparation of *Populus alba* L. Stem peeling in Biyara orchard

60. *Salix acmophylla* Boiss. (K: bee; E: willow)

The young branches are used locally for making baskets (K: barchina) (Fig. 7-23:1), beehives (K: zambila mish hanig) (Fig. 7-23: 2), and bread baskets (K: tilyana) (Fig 7-23: 3).

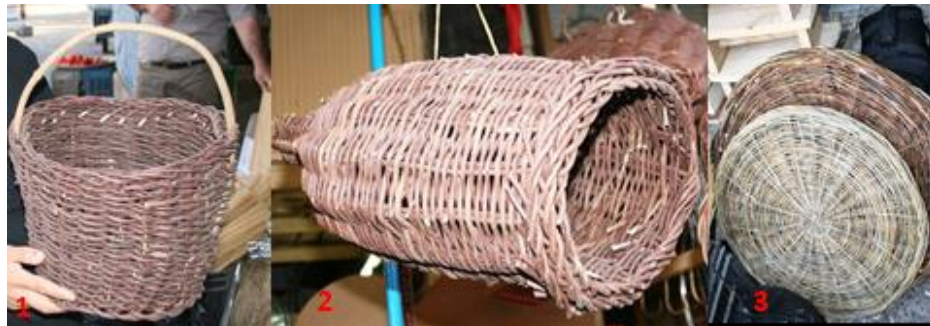


Figure 7-23: 1. Baskets. – 2. Beehive. – 3. Bread basket

27. Family SCROPHULARIACEAE

61. *Verbascum alceoides* Boiss & Hausskn. (K: chrawg; E: mullein)

The dry branches of this plant are used as a source of light (K: chrawig). The are used as a candle and put the fire from the side to light up a room for about two hours.

28. Family ULMACEAE

62. *Celtis australis* L. (K: dara rash; E: hackberries)

The young branches are used for making cane.

29. Family URTICACEAE

63. *Urtica dioica* L. (K: gazna, gia doupshka; E: stinging nettle)

The fresh and green leaves are used as a compress for treating rheumatism.

30. Family VITACEAE

64. *Vitis vinifera* (K: meu; E: common grape vine) (Fig. 7-24)

The leaf is used for making dolma. The fruit is eaten fresh or dried under the sun to preparing raisin (mewezh). Syrup (K: doshaw, doshaw-e-tre), is prepared from the fresh fruits of both white and black grapes. Also, the fruits are fermented to prepare wine and vinegar.



Figure 7-24: The leaves of *Vitis vinifera* L. for sale in Khurmall bazar

ADDITIONAL USES

Several species are used in various combinations for different purposes. The following are some examples:

1. **Gizra** (E: Hay) (Fig. 7-25).

Many legumes and grasses, together with some other species, form dens covers on hillsides. In addition to their use as a grazing landscape for cattle, sheep, and goats, they are harvested by scythe (K: karantu) and the hay (K: Gizra) is used in winter as a fodder.



Figure 7-25: Making gizra in Sharazoor

2. **Paste** (K: guzhma)

A paste is prepared from a mixture of almond (*Prunus amygdalus*), black raisin (*Vitis vinifera*), and ripe wild pistachio (*Pistacia khinjuk*) fruits (K: bnawshela, wanamishk) by crushing and blending the mixture. Guzhma and bread were eaten as the main meals by people of caravans transporting goods from the country side to cities in the old days.

Table 7-1a: Traditional uses of different plant species

No.	Species name	Drinks	Fruit	Food	Tools	Condiments	Vegetables	Medicine	Others
1	<i>Acer monspessulanum</i>				x				
2	<i>Allium akaka</i>			x					
3	<i>Ammi majus</i>				x				
4	<i>Anchusa italica</i>				x				
5	<i>Anethum graveolens</i>					X			
6	<i>Arctium lappa</i>							x	
7	<i>Artemisia haussknechtii</i>							x	
8	<i>Arum italicum</i>			x					
9	<i>Astragalus sp.</i>								gum
10	<i>Bellis perennis</i>								ornamental
11	<i>Celtis australis</i>				x			x	
12	<i>Cicer arietinum</i>			x					
13	<i>Crataegus azarolus</i>		x						
14	<i>Crataegus monogyna</i>		x						
15	<i>Ferulago abbreviata</i>							x	
16	<i>Ferulago angulata</i>			x					
17	<i>Ficus carica</i>	x	x					x	
18	<i>Fraxinus syriaca</i>				x				
19	<i>Fritillaria imperialis</i>								ornamental
20	<i>Gundelia tournefortii</i>		x	x			x		
21	<i>Hymenocrater longiflorus</i>							x	
22	<i>Imperata cylindrica</i>			x					
23	<i>Iris aucheri</i>								ornamental
24	<i>Iris germanica</i>								ornamental
25	<i>Iris reticulata</i>							x	
26	<i>Juglans regia</i>		x		x				fibers
27	<i>Lathyrus annuus</i>			x					
28	<i>Lens culinare</i>			x					
29	<i>Malva spp.</i>			x					
30	<i>Melissa officinalis</i>			x					
31	<i>Morus alba</i>		x						
32	<i>Morus nigra</i>		x						

Table 7-1b: continued.

N0.	Species name	Drinks	Fruit	Food	Tools	condiments	Vegetables	Medicine	Others
33	<i>Notobasis syriaca</i>						x		
34	<i>Paliurus spina-christi</i>							x	
35	<i>Phalaris arundinacea</i>			x					
36	<i>Phragmites australis</i>				x				fences, mats
37	<i>Pistacia eurycarpa</i>		x			x			gum
38	<i>Pisum sativum</i>			x					
39	<i>Plantago major</i>							x	
40	<i>Plantago lanceolata</i>							x	
41	<i>Platanus orientalis</i>								fibers
42	<i>Populus alba</i>								fibers
43	<i>Portulaca oleracea</i>			x					
44	<i>Prunella vulgaris</i>							x	
45	<i>Prunus amygdalus</i>		x						
46	<i>Prunus armeniaca</i>		x						
47	<i>Prunus domestica</i>		x						
48	<i>Prunus microcarpa</i>		x		x				
49	<i>Punica granatum</i>	x	x						tanning
50	<i>Quercus aegilops</i>		x	x					tanning
51	<i>Quercus infectoria</i>		x	x					tanning
52	<i>Rheum ribes</i>						x		
53	<i>Rosa canina</i>		x						
54	<i>Rubus spp.</i>		x						
55	<i>Rumex crispus</i>			x					
56	<i>Salix acmophylla</i>				x				
57	<i>Satureja laxiflora</i>								flavoring
58	<i>Scorzonera spp.</i>						x		
59	<i>Silybum marianum</i>						x		
60	<i>Tragopogon longirostris</i>							x	
61	<i>Triticum spp.</i>			x					
62	<i>Urtica dioica</i>								
63	<i>Verbascum alceoides</i>								source of light
64	<i>Vitis vinifera</i>	x	x	x					
#	Total	3	18	19	9	2	6	13	14

CONCLUSIONS

This study reveals a substantially higher number of plant species for Hawraman Mountain, compared to previous collections in national and foreign herbaria and reports in the literature. As surveyed herein, all prior collections from Hawraman by Haussknecht (96 spp.), Gillett (73 spp.), Rechinger (280 spp.), Rawi (295 spp.), Hadač (35 spp.), and other local and foreign botanists add to 674 taxa in 76 families of vascular plants. What makes this study a very important resource for Kurdistan Iraq in general and Hawraman in particular is that 1075 taxa in 90 families were recorded. Of these, 951 taxa were collected during this current study, and only 124 taxa were reported in the Flora of Iraq and Flora Iranica but not collected by the present author.

This study adds 15 families and 426 taxa as new to the Hawraman area checklist and four species new to science: *Ferula shehbaziana* (Apiaceae), *Onosma hawramanensis* (Boraginaceae), *Gypsophila sarbagiae* (Caryophyllaceae), and *Scrophularia sulaimanica* (Scrophulariaceae). The study also adds the following 19 species as new to the flora of Iraq: Apiaceae (*Heracleum persicum*), (*Trigonosciadium brachytaenium*), Araceae (*Arum dioscoridis*), Asteraceae (*Filago eriocephala*), Boraginaceae (*Alkanna orientalis*), (*Nonea ventricosa*), Caryophyllaceae (*Gypsophila caricifolia*), (*Silene coniflora*), Cyperaceae (*Schoenoplectus lacustris*) Gentianaceae (*Centaurium meyeri*), Lamiaceae (*Marrubium parviflorum*), (*Nepeta nuda*), Liliaceae (*Fritillaria strausii*), (*Tulipa clusiana*), Poaceae (*Bromus intermedius*), Plantaginaceae (*Linaria simplex*), Polygonaceae (*Polygonum convolvulus*), (*Polygonum hydropiper*) and Rosaceae (*Prunus lycioides*).

This current study is reporting for the first time 15 families and 392 taxa as new to Hawraman Mountain. It also adds 19 species of flowering plants as new to the flora of Iraq. These novelties (with their checklist numbers in parentheses) are: (57) *Heracleum persicum* Desf. ex Fisch., (38) *Trigonosciadium brachytaenium* (Boiss) Alava, (92) *Arum dioscoridis* Sibth. & Sm., (189) *Filago eriocephala* Guss., (556) *Alkanna orientalis* Boiss., (70) *Nonea ventricosa* (Sm.) Griseb., (403) *Gypsophila caricifolia*

Conclusions and recommendations

Boiss., (418) *Silene coniflora* Nees ex Oth., (112) *Schoenoplectus lacustris* (L.) Palla, (616) *Centaurium meyeri* (Bunge) Druce, (662) *Marrubium parviflorum* Fisch. & C.A.Mey., (671) *Nepeta nuda* L., (719) *Fritillaria strausii* Bornm., (720) *Tulipa clusiana* DC., (180) *Bromus intermedius* Guss., (180) *Linaria simplex* (Willd.) DC., (201) *Polygonum convolvulus* L., (202) *Polygonum hydropiper* L., and (978) *Prunus lycioides* (Spach) Schneid.

This thesis has identified 33 species as endemic to all four parts of Kurdistan in Iraq, Iran, Syria, and Turkey, of which three (*Silene avramana* Boiss. & Hausskn., *Astragalus tawilicus* C.C.Towns., and *Dionysia bornmuelleri* (Pax) Clay) are restricted to Hawraman area on its both sides of Kurdistan Iraq and Iran. All three species are critically endangered according to the IUCN Red List.

The shared number of plants between Hawraman and the other mountains (Halgurd, Sakri Sakran, Qandil, and Assos) is 882 taxa (or 85%). The shared number of plants taxa between Hawraman and Iran is 739 taxa (or 76%), that between Hawraman and Turkey is 622 (65%), and between Hawraman and Syria is 316 (33%).

RECOMMENDATIONS

The present study recommends the following points to be taken into consideration for future research on the flora of Kurdistan, as well as for providing appropriate approaches to be used for that purpose:

First, undertaking surveys similar to the present one for poorly explored parts of Kurdistan Iraq, so that such studies collectively become the basis for completing a Kurdistan flora.

Second, conducting ethnobotanical research in different areas of Kurdistan. The rapidly changing landscape in every aspect of life in Kurdistan is threatening many of the traditional uses of plants by the local people, and the sooner these are documented, the better.

Third, collecting data on the conservation status of plant species of Kurdistan Iraq and evaluating them based on the IUCN criteria. Such studies are the foundation for preparing a redbook checklist of Kurdistan plants. In order to conserve Kurdistan plants, we need to know what is rare, threatened, or endangered, and studies like the present one are much needed.

Fourth, using GIS (Geographic Information System) techniques and maps are strongly recommended in future research to provide a better understanding of the geographical distribution, mapping, vegetation, and habitat types of Kurdistan plants.

Fifth, this study strongly recommends that Hawraman area becomes a national park or protected area based on the IPA (Important Plant Area) criteria suggested by Plantlife International (2002), the link of which is given on p. 268. It has more than 35% of the total vascular plants of Iraq.

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Appendices

Appendix 1: The endemic taxa in Haraman region

	Taxa	Family
1	<i>Allium qaradaghense</i>	ALLIACEAE
2	<i>Ferula shehbaziana</i>	APIACEAE
3	<i>Ferulago bracteata</i>	APIACEAE
4	<i>Turgenia lisaeoides</i>	APIACEAE
5	<i>Cousinia inflata</i>	ASTERACEAE
6	<i>Alkanna orientalis</i>	BORAGINACEAE
7	<i>Onosma cardiostegium</i>	BORAGINACEAE
8	<i>Onosma haussknechtii</i>	BORAGINACEAE
9	<i>Onosma hawramanensis</i>	BORAGINACEAE
10	<i>Onosma macrophyllum</i> var. <i>angustifolium</i>	BORAGINACEAE
11	<i>Alyssum penjwinense</i>	BRASSICACEAE
12	<i>Buffonia calycina</i>	CARYOPHYLLACEAE
13	<i>Gypsophila sarbaghiaae</i>	CARYOPHYLLACEAE
14	<i>Minuartia sublineata</i>	CARYOPHYLLACEAE
15	<i>Silene araratica</i>	CARYOPHYLLACEAE
16	<i>Silene avramana</i>	CARYOPHYLLACEAE
17	<i>Astragalus carduchorum</i>	FABACEAE
18	<i>Astragalus caryolobus</i>	FABACEAE
19	<i>Astragals globiflorus</i>	FABACEAE
20	<i>Astragalus gudrunensis</i>	FABACEAE
21	<i>Astragalus octopus</i>	FABACEAE
22	<i>Astragalus sarae</i>	FABACEAE
23	<i>Astragalus tawilicus</i>	FABACEAE
24	<i>Phlomis kurdica</i>	LAMIACEAE
25	<i>Stachys kurdica</i>	LAMIACEAE
26	<i>Teucrium melissoides</i>	LAMIACEAE
27	<i>Alcea arbelensis</i>	MALVACEAE
28	<i>Stipa kurdistanica</i>	POACEAE
29	<i>Dionysia bornmuelleri</i>	PRIMULACEAE
30	<i>Delphinium pallidiflorum</i>	RANUNCULACEAE
31	<i>Galium kurdicum</i>	RUBIACEAE
32	<i>Scrophularia sulaimanica</i>	SCROPHULARIACEAE
33	<i>Vitis hissarica</i> Vass. subsp. <i>rechingeri</i>	VITACEAE

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<i>Zoegea erinita</i>	65
<i>Zoegea leptaurea</i> L. subsp. <i>mesopotamica</i>	65
<i>Zosima absinthifolia</i>	38
ZYGOPHYLLACEAE	236

Appendices

Appendix 3: The list of site name with their code and GPS information from 2011 to 2013

Date	Site Name	Site code	Way point	Elevation	Longitude	Latitude
30/3/2011	Biyara	H1-11	1	1059	35° 13' 35"	46° 06' 05"
30- 3- 2011	Zardahall	H2-11	2	762	35° 14' 19"	46° 03' 34"
30- 3- 2011	above Khurmall	H3-11	3	730	35° 15' 21"	46° 03' 48"
30/3/2011	Biyara orchard	H4-11	4	1131	35° 13' 35"	46° 07' 06"
16/4/2011	Kharpane	H5-11	5	1293	35° 11' 45"	46° 07' 11"
16/4/2011	Awesar	H6-11	6	1742	35° 12' 53"	46° 11' 07"
16/6/2011	Near Tawella on the road	H7-11	7	1384	35° 11' 00"	46° 10' 21"
17/4/2011	Daga shekhan	H8-11	8	1209	35° 12' 41"	46° 07' 41"
17/4/2011	Zardahall village	H9-11	9	842	35° 14' 16"	46° 04' 26"
17/4/2011	Qadafare village	H10-11	10	508	35° 13' 37"	45° 57' 13"
26/4/2011	Khurmall town	H11-11	11	557	35° 18' 12"	46° 02' 14"
26/4/2011	near Hana khulla	H12-11	12	614	35° 20' 44"	46° 00' 21"
26/4/2011	Hana Khulla	H13-11	13	1128	35° 19' 15"	46° 04' 02"
26/4/2011	near Bane shar	H14-11	14	1046	35°19' 19"	46° 03' 46"
26/4/2011	Bane Shar	H15-11	15	549	35° 18' 16"	46° 00' 54"
27/4/2011	Shnerwe mountainn	H16-11	16	1483	35° 09' 44"	46° 03' 12"
27/4/2011	Shnerwe mountainn	H17-11	17	1360	35° 09' 59"	46° 03' 11"
27/4/2011	Shnerwe mountainn	H18-11	18	1142	35° 10' 05"	46° 02' 25"
27/4/2011	Kolkne haje mohamad	H19-11	19	543	35° 18' 09"	45° 59' 34"
4/5/2011	Shera Marr village	H20-11	20	575	35° 19' 38"	46° 00' 14"
4/5/2011	Qullakhana village	H21-11	21	511	35° 19' 29"	45° 57' 58"
4/5/2011	Hanae Nawa mountainn	H22-11	22	1713	35° 17' 37"	46° 08' 06"
4/5/2011	Challow	H23-11	23	1272	45° 07' 32"	46° 07' 32"
4/5/2011	Between challaw and hanae nawa	H24-11	24	1582	35° 17' 23"	46° 08' 10"
4/5/2011	On the road near hane garmalla village	H25-11	25	1207	35° 17' 36"	46° 08' 34"
5/5/2011	On the mountainn behaind Awesar near wether station	H26-11	26	2030	35° 13' 11"	46° 10' 41"
5/5/2011	Lase Marf Abdula	H27-11	27	2200	35° 13' 30"	46° 10' 21"
5/5/2011	Between lase marf and chnaraka	H28-11	28	2060	35° 13' 02"	46° 09' 44"
5/5/2011	Gullakhana village	H29-11	29	1236	35° 20' 12"	46° 03' 29"
10/5/2011	zallm river	H30-11	30	502	35° 18' 26"	45° 58' 17"
10/5/2011	By the end of zallm river	H31-11	31	470	35° 16' 41"	45° 53' 57"
11/6/2011	Khurmall	H32-11	32	570	35° 18' 10"	46° 02' 16"
31/5/2011	Daga shekhan	H33-11	33	1362	35° 12' 37"	46° 08' 01"
31/5/2011	Chame wazana	H34-11	34	1450	35° 12' 26"	46° 08' 17"
31/5/2011	Susakan	H35-11	35	1452	35° 12' 09"	46° 08' 26"
1/6/2011	Byiara orchrd	H36-11	36	1111	35° 13' 45"	46° 07' 10"

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1/6/2011	Near Ballkha vallige	H37-11	37	1566	35° 12' 20"	46° 08' 43"
1/6/2011	The mountainn, above Ballkha	H38-11	38	1739	35° 12' 39"	46° 08' 45"
1/6/2011	Ballkha mountainn	H39-11	39	1837	35° 12' 40"	46° 09' 01"
1/6/2011	Timberline, Ballkha mountainn, above the Walnut orchard	H40-11	40	1907	35° 12' 50"	46° 09' 10"
	Sharazoor	H41-11	41	596	35° 11' 47"	45° 56' 00"
31/5/2011	Ahmad Awa/ tourist place	H42-11	42	884	35° 19' 00"	46° 05' 25"
4/7/2011	Above Ahmad Awa	H43-11	43	1050	35° 19' 07"	46° 05' 48"
4/7/2011	Ahmad Awa village	H44-11	44	780	35° 18' 41"	45° 03' 59"
4/7/2011	Near zallm river	H45-11	45	508	35° 18' 12"	45° 58' 36"
5/7/2011	Shnerwe mountainn	H46-11	46	1437	35° 09' 49"	46° 03' 17"
5/7/2011	Pike of shnerwe mountainn	H47-11	47	1681	35° 09' 34"	46° 03' 50"
5/8/2011	Between Shnerwe and bafre mer	H48-11	48	1800	35° 08' 20"	46° 04' 44"
5/7/2011	Bafre meer	H49-11	49	2005	35° 08' 03"	46° 06' 11"
5/7/2011	Near Ababaili village	H50-11	50	1039	35° 10' 08"	46° 02' 05"
9/7/2011	Biyara orchard	H51-11	51	1075	35° 13' 31"	46° 06' 57"
9/7/2011	Awesar	H52-11	52	1742	35° 12' 53"	46° 11' 07"
14/7/2011	Tawella orchard	H53-11	53	1336	35° 11' 06"	46° 10' 39"
14/ 7/ 2011	Near Ballkha village	H54-11	54	1543	35° 11' 44"	46° 09' 24"
14/7/2011	Ballkha orchard	H55-11	55	1618	35° 12' 26"	46° 09' 24"
14/7/2011	Daga shekhan	H56-11	56	1209	35° 12' 41"	46° 07' 41"
20/7/2011	Haneden mountainn	H57-11	57	1213	35° 17' 02"	46° 07' 17"
20/7/2011	Hanaeden mountainn	H58-11	58	1788	35° 17' 19"	46° 08' 33"
20/7/2011	Hanaedn mountainn	H59-11	59	2035	35° 17' 00"	46° 08' 50"
20/7/2011	Biyara orchard	H60-11	60	1138	35° 13' 57"	46° 07' 24"
28/7/2011	Tawella mountainn	H61-11	61	1864	35° 13' 03"	46° 10' 59"
27/7/ 2011	Between weather station and Lase Marf	H62-11	62	2001	35° 13' 09"	46° 10' 39"
27/7/2011	Lase Marf	H63-11	63	2030	35° 13' 11"	46° 10' 41"
27/7/2011	Above Ballkha orchards	H64-11	64	1884	35° 12' 46"	46° 09' 51"
2/4/ 2012	Awesar	H1-12	1	1594	35° 12' 39"	46° 10' 54"
2/4/ 2012	Near Ballkha village	H2-12	2	1559	35° 12' 19"	46° 08' 42"
24/ 4/2012	Tapa Gwlawi	H3-12	3	501	35° 16' 55"	45° 56' 53"
24/ 4/2012	Kane spi	H4-12	4	472	35° 14' 45"	45° 52' 52"
24/ 4/2012	Tapai Safa Lower	H5-12	5	535	35° 17' 20"	45° 58' 52"
24/ 4/2012	Near Khurmll	H6-12	6	666	35° 13' 16"	46° 03' 17"
25/ 4/2012	Near Halabja	H7-12	7	823	35° 12' 35"	46° 01' 27"
25/ 4/2012	Near Darashesh Village	H8-12	8	838	35° 12' 28"	46° 02' 39"
25/ 4/2012	Near Darashesh Village	H9-12	9	968	35° 11' 53"	46° 03' 35"
25/ 4/2012	Biyara Orchard	H10-12	10	1135	35° 13' 41"	46° 06' 35"
31/4/2012	zallm river	H11-12	11	594	35° 17' 53"	46° 03' 27"
31/4/2012	Nawbaxan village	H12-12	12	626	36° 18' 00"	46° 03' 29"

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31/4/ 2012	Near Biyara	H13-12	13	1103	35° 13' 09"	46° 06' 58"
1/5/2012	Darashesh	H14-12	14	954	35° 11' 38"	46° 03' 09"
1/5/ 2012	Between Darashesh and Hawar	H15-12	15	1069	35° 11' 13"	46° 04' 22"
1/ 5/ 2012	Hawar mountainn	H16-12	16	1358	35° 10' 18"	46° 05' 16"
1/ 5/ 2012	Hawar valley	H17-12	17	1190	35° 10' 14"	46° 05' 59"
1/ 5/ 2012	Hawar mountainn	H18-12	18	1216	35° 09' 44"	46° 06' 18"
20/ 5/ 2012	Shram mountainn	H19-12	19	1634	35° 15' 15"	46° 07' 29"
20/ 5/ 2012	Biyara	H20-12	20	1023	35° 13' 24"	46° 06' 14"
20/ 5/ 2012	Near Kollkne haje mohamad	H21-12	21	528	35° 18' 07"	45° 59' 28"
21/ 5/ 2012	beside the road between Ababaili and Darashesh	H22-12	22	883	35° 12' 22"	46° 02' 06"
21/ 5/ 2012	Hawar mountainn	H23-12	23	1455	35° 10' 08"	46° 05' 17"
21/ 5/ 2012	Hawar village	H24-12	24	922	35° 09' 40"	46° 07' 12"
21-May-12	Near Hawar village	H25-12	25	1173	35° 03' 57"	46° 06' 13"
21/ 5/ 2012	Near Darashesh	H26-12	26	1223	35° 10' 45"	46° 05' 08"
28/ 5/ 2012	Hawara Barza Mountain	H27-12	27	2038	35° 13' 20"	46° 09' 34"
28/ 5/ 2012	Near Kharpane Village	H28-12	28	749	35° 13' 28"	46° 03' 10"
29/ 5/ 2012	Daramar Mountain	H29-12	29	2048	35° 17' 50"	46° 08' 49"
3/ 6/ 2012	Besid the road near Sargat village	H30-12	30	1036	35° 17' 06"	46° 06' 11"
3/ 6/ 2012	Sargat valley	H31-12	31	1110	35° 17' 46"	46° 06' 16"
3/ 6/ 2012	Near Ballkha village	H32-12	32	1536	35° 11' 45"	46° 09' 22"
3/ 6/ 2012	Ballkha village	H33-12	33	1535	35° 12' 12"	46° 08' 44"
3/ 6/ 2012	Grde Chaqal Awa	H34-12	34	546	35° 18' 06"	46° 01' 21"
8/ 6/ 2012	Rangin Mountain	H35-12	35	1686	35° 21' 06"	45° 05' 01"
8/ 6/ 2012	Rangin Mountain	H36-12	36	2004	35° 21' 20"	46° 05' 19"
16/ 6/ 2012	Ballkha mountainn	H37-12	37	1895	35° 12' 45"	46° 09' 07"
16/ 6/ 2012	Chnaraka	H38-12	38	2060	47° 13' 02"	58° 09' 44"
16/ 6/ 2012	Lase Marf	H39-12	39	1895	35° 12' 45"	46° 09' 07"
19/ 6/ 2012	Dalane mountainn	H40-12	40	1723	35° 20' 20"	46° 06' 22"
19/ 6/ 2012	Dalane mountainn	H41-12	41	2506	35° 20' 01"	46° 07' 36"
25/ 6/ 2012	Tapa zerina	H42-12	42	506	35° 19' 43"	45° 57' 32"
25/ 6/ 2012	Between Khurmall and Zardahal	H43-12	43	648	35° 16' 24"	46° 03' 04"
25/ 6/ 2012	Biyara Orchard	H44-12	44	1112	35° 13' 35"	46° 06' 33"
25/ 6/ 2012	Zallm River	H45-12	45	501	35° 18' 25"	45° 58' 14"
25/ 6/ 2012	Khurmall(Mzgawta kone)	H46-12	46	556	35° 18' 15"	46° 02' 14"
3/ 7/ 2012	Dara shesh	H47-12	47	1056	35° 11' 18"	46° 03' 56"
3/ 7/ 2012	Hawar Mountainn	H48-12	48	1036	35° 11' 19"	46° 04' 18"
3/ 7/ 2012	Hawar Orchard	H49-12	49	960	35° 09' 39"	46° 07' 23"
3/ 7/ 2012	Dara shesh mountainn	H50-12	50	1485	35° 10' 25"	46° 04' 37"
7/ 7/ 2012	Shnirwe Mountain	H51-12	51	1322	35° 10' 04"	46° 03' 00"
7/ 7/ 2012	Shnirwe Mountain	H52-12	52	1810	35° 09' 01"	46° 04' 09"
7/ 7/ 2012	Tawella orchard	H53-12	53	1661	35° 12' 52"	46° 11' 17"

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10/ 7/ 2012	Dare Marr mountainn	H54-12	54	2245	35° 18' 10"	46° 08' 56"
12/7/2012	Bafri meer mountain	H55-12	55	1839	35° 07' 56"	46° 05' 19"
12/7/2012	Zallm river	H56-12	56	504	35° 18' 24"	45° 58' 27"
16- 7-2012	Hanae Nawa	H57-12	57	2510	35° 17' 01"	46° 09' 23"
19- 7- 2012	Dallane mountainn	H58-12	58	2506	35° 20' 01"	46° 07' 36"
19-7-2012	Dallane mountainn	H59-12	59	1723	35° 20' 20"	46° 06' 22"
19-7 – 2012	Dalane mountainn	H60-12	60	1404	35° 20' 12"	46° 06' 10"
31-7-2012	Shnirwe Mountain	H61-12	61	1381	35° 19' 48"	46° 03' 03"
1-8 2012	Above Awesar	H62-12	62	1970	35° 13' 09"	46° 10' 45"
1/9/2012	zallm river	H63-12	63	538	35° 13' 09"	46° 10' 45"
1/9/2012	Biyara Orchard	H64-12	64	1161	35° 13' 28"	46° 07' 09"
22/5/2013	Near Ballkha village	H1- 13	1	1546	35° 12' 20"	46° 08' 42"
22/5/2013	Ballkha mountain	H2- 13	2	1980	35° 12' 54"	46° 09' 33"
22/5/2013	Susakan	H3- 13	3	1516	35° 11' 57"	46° 09' 11"
22/5/2013	Biyara orchard	H4- 13	4	1132	35° 13' 52"	46° 07' 18"
7/6/2013	Dagashexan	H5- 13	5	1254	35° 13' 12"	46° 07' 35"
7/6/2013	Awesar	H6- 13	6	1612	35° 12' 13"	46° 10' 57"
7/6/2013	Tapa Gwlawi	H7- 13	7	501	35° 16' 55"	45° 56' 53"

Appendices

Appendix 4: The list of scientific name and their Kurdish name

Scientific name	Kurdish name in Latin word	Kurdish nme
<i>Acantholimon caryophyllaceum</i>	KIFWER	کیفوهر
<i>Acer monspessulanum</i>	KEVOT-KEWÛT-KÛT	کەمۆت-کەمۆت-کۆت
<i>Adiantum capillus veneris</i>	QAITERAN-QETRANE	قەیتەر ان - قەترانە
<i>Adonis annua</i>	GÛLLE SÛRE	گۆلە سوورە
<i>Adonis microcarpa</i>	NEWROZ	نەروۆز
<i>Aegilops lorentii</i>	KÛTKE	کووتکە
<i>Aegilops triuncialis</i>	KÛTKE	کووتکە
<i>Aegilops umbellata</i>	KAR KÛKHÎNK-KÛTKE	کار کوو خینک- کووتکە
<i>Agrimonia eupatoria</i>	NAN RÊWAS	نان رینواس
<i>Alcea arbelensis</i>	GULLE HÊRO	گۆلە هێرۆ
<i>Alcea kurdica</i>	GULLE HÊRO	گۆلە هێرۆ
<i>Alcea sulphurea</i>	GULLE HÊRO	گۆلە هێرۆ
<i>Allium akaka-haemanthoides</i>	LÛŞE	لووشە
<i>Allium ampeloprasum</i>	KEWER-KÛIR	کەمەر - کوویر
<i>Allium phaneranthrum</i>	SÎR-HAMÛRSÂQ	سیر-هاموورساق
<i>Allium qaradaghense</i>	PIYAZ Î KÊWÎ	پیازی کێوی
<i>Allium stamineum</i>	PIASA KUANA-SÊBISKE	پپاسا کووانا- سێ بسکە
<i>Alopecurus utriculatus</i>	KAR KÛKHÎNKE-KERKHINKÊNE	کار کوو خینە- کەرخنکینە
<i>Althaea cannabina</i>	ÇAI-HÊRO	چای-هێرۆ
<i>Althaea hirsuta</i>	KHER KHERÛK	خەر خەرۆک
<i>Althaea officinalis</i>	GULLE HÊRO-HARMELE	گۆلە هێرۆ - هەر مەلێ
<i>Alyssum strigosum</i>	GIYATIVIRIK	گیاتیفیریک
<i>Anagallis arvensis</i>	GULLE ZAWA	گۆلە زوا
<i>Anagyris foetida</i>	QEREH QAC	قەر قەج
<i>Anchusa italica</i>	GOZIRWAN-GÛRMIZE-KELESHÎNA	گۆزروان-گۆرمزە-کەلەشینە
<i>Anemone coronaria</i>	GAGÛR-GÛLLE NÎSAN	گاگۆر-گۆلە نیشان
<i>Anthemis haussknechtii</i>	HACILE-BEIBÛN	حاجیلە-بەیبۆن
<i>Aristolochia bottae</i>	RATILLSAK-ZARIND- ZARAWÂND- PALAŞIR-BAROKE-MÂRESKA- QÛRTLÛCE	رانتلساک-زار نندزار اواند-پالاشیر-بارۆکە- مار نەسکاک-قۆرتلۆجە
<i>Arrhenatherum kotschyi</i>	ŞAFEUG	شافووک
<i>Arum conophalloides</i>	KARDÛ	کار دو
<i>Arum italica</i>	KARDÛ	کار دو
<i>Asperula insignis</i>	GÛLLE SIPÎ	گۆلە سێپێ
<i>Asphodelus microcarpus</i>	GULLE -CAFÎÛL-CAFILOK	جافیلۆک- جافیلۆک-گۆلە
<i>Astragalus brachystachys</i>	GUNESGANE	گۆنەسەگانه
<i>Astragalus gossypinus</i>	GUINI-JÛNÎ	گۆنی-ژوونی
<i>Astragalus gudrunensis</i>	DÛFILÛŞKE-DÛKOLIŞKAN	دوو فلیشکە-دیکۆ لیشکان
<i>Astragalus michauxianus</i>	GUNE SEGANE	گۆنەسەگانه
<i>Astragalus rhodochrous</i>	JÛNÎ	ژوونی
<i>Aubrieta parviflora</i>	BONKHOŞKE	بۆنخۆشکە
<i>Avena fatua</i>	HELLÎT-PERE SIPÎ	هەللیت-پەر سێپێ
<i>Avena ludoviciana</i>	SANGRA KIA-GÎYA ABRÎŞHI-GIYA	سەنگر مکیا-گیانابریشی-گیانگەنم

Appendices

	GANUM	
<i>Bellevia macrobrya</i>	GWÊ BERKHE	گوئی بهرخه
<i>Biebersteinia multifida</i>	KILKE RÊWÎ	کلکریوی
<i>Biscutella didyma</i>	GIYA DABENCUK	گیادابنجوک
<i>Bongardia chrysogonum</i>	GEBLE-CATÎK	گمبله
<i>Bothriochloa ischaemum</i>	CATÎK	جانیک
<i>Bromus danthoniae var.danthoniae</i>	PÛŞKURK GUR-CAKURK-KEMÎNEKE	پوشکورک گور-جاکورک-کسینهکه
<i>Bromus tectorum var.hirsutus</i>	GIYA GÛFIK	گیا گوفاک
<i>Bromus tectorum var.tectorum</i>	GIYA GÛFIK	گیا گوفاک
<i>Bryonia multiflora</i>	MEREJO-MEWE MARANE-TIRE-MARANE	مسر مژو-میوماران-تیرئ مارانه
<i>Callipeltis cucullaris</i>	SERMÊRIK	سسر میرک
<i>Capparis spinosa var.parviflor</i>	MARE GÎRE-MARGIRE	مار مگیره-مار گره
<i>Carduus pycnocephalus</i>	ÇAW BAZE	چاوباز-چاویوره
<i>Carex diluta</i>	ZELLEWARIDE-ZELLEWIRDE	زلموارده-زلمورده
<i>Carex distans</i>	ZEL	زط
<i>Carex divisa</i>	ZEL	زط
<i>Carex divulsasubsp.leersii</i>	ZEL	زط
<i>Carex otrubae</i>	ZEL	زط
<i>Carex pachystylis</i>	ZEL	زط
<i>Carex polyphylla</i>	GIY ÂREŞE	گیارمه
<i>Carthamus oxyacanthus</i>	DIRKA ZERDE-ZERDE SÎRÎ	درکه زمرده-زمرده سیری
<i>Centaurea solistitialis ssp.solistitialis</i>	PILÛŞE	پلوشه
<i>Cephalaria syriaca</i>	MÛR-ZÎWAN	موور-زیوان
<i>Cheilanthes fragans</i>	QEITERAN	قیتیران
<i>Chrozophora tinctoria</i>	ZUREIC-QAPKEWELE	زورج-قاپکهوله
<i>Cicer arietinum</i>	NÛK	نووک
<i>Cichorium intyus</i>	ÇEQÇEQE- QALÛR	چمچهقه-قالور
<i>Cichorium crocifolium</i>	ERFÎS-NÊRGIS-GULLE MENDÎL	نمریس-نیزگس-گولمه‌مندیل
<i>Cichorium kostschyi</i>	JOTARUK-KÛLÛK CÛTYAN-GIY ACUTYARE	گیاجوتیاره-جوتاروک-کولوک جوتیان
<i>Comperia comperiana</i>	GIYA SALIME	گیاسالمه
<i>Convolvulus arvensis</i>	MELEWÊÇE-LAWLAW	ملموچیه-لاولاو
<i>Cornus sanguinea</i>	DÂR QAR-MALWÎCE	دار قار-مالویچه
<i>Coronilla scorpioides</i>	SÊPENÇE	سینپنچه
<i>Crataegus azarolus</i>	GOYÎJ	گوییز
<i>Crataegus monogyna</i>	GOYÎJ	گوییز
<i>Crepis alipina</i>	QALÛRE	قالوره
<i>Crepis foetida</i>	ÇÛNG	چوونگ
<i>Crocus cancellatus.subsp.damascenus</i>	BÎFOK	بیفوک
<i>Cupressus sempervirens</i>	SERÛ	سسر وو
<i>Cuscuta brevistyla</i>	TIRETIRE	تیرتیره
<i>Cuscuta monogyna</i>	TIRETIRE	تیرتیره
<i>Cynodon dactylon.var.dactylon</i>	JÎYAN	ژیان
<i>Cyperus fuscus</i>	ZEL	زط
<i>Cyperus longus.var.pallidior</i>	DAREV-SOTKE-FIZFÎZOK	دارهف-سوتکه-فیزفیزوک
<i>Cyperus rotundus</i>	SIMILL	سمل
<i>Daphne mucronata</i>	ŞWAŞÎNÎK-TÎRWA-TÊRÛ	شوواشینیک-تیروا-تیروو

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<i>Echinops blancheanus</i>	KERTETEŞİ-SELKETEŞİ-ŞAKTIROK-ŞEKROKE	کەر تەتەشى-سەلکەتەشى-شەکتەرۆک-شەکرۆکە
<i>Eredium cicutarium</i>	DENÛKÏLEQLEQ-GULLE SE'AT	دەنووک لەفەلمق-گۆلەسەعات
<i>Eremurus cappadocicus</i>	MAM CEJNÊ-SIRÊŞ	مام جەژنئە-سەرنەش
<i>Erysimum alpestre</i>	DÛBISER	دوو بێسەر
<i>Erysimum gladiiferum</i>	KUCILIK	کۆجلیک
<i>Erysimum kurdicum</i>	GELÛKEZERID-HALEKAK	گەلوکەزەر د-هالەکاک
<i>Erysimum repandum</i>	ŞEWBO	شەمبوو
<i>Euaphorbia aleppica</i>	PÊQEL	پەقەل
<i>Euaphorbia denticulata</i>	ŞÎRKOIK-SHÎR KHUŞÏLK-ŞÎRÎMAR	شیرکۆچیک-شیرخوشلیک-شیری مار
<i>Euaphorbia macrocarpa</i>	ŞELÊMA	شەلمە
<i>Euaphorbia macroclada</i>	ŞÎRKITIK-ŞIARAK-KUCILKORK -HUJELIK	شیرکۆتک-شیاراک-کۆجیلکۆرک-هۆژەلک
<i>Euphorbia Çamaesyce</i>	NERMOKA	نەرمۆکە
<i>Euphorbia helioscopia</i>	ŞÎRKITIK	شیرکۆتک
<i>Fraxinus pennsylvanica</i>	BINAW	بەناو
<i>Feaxinus syriaca</i>	BINAW-BENAWÎ-BÊNAWTE-DAREREŞ	بەناو-بەناوی-بەناوتە-دارەرەش
<i>Fibigia suffruticosa</i>	ŞEWBO	شەمبوو
<i>Ficus carica v. carica</i>	HENCÎR	هەنجیر
<i>Fritilarria imperialis</i>	ŞÎLÊR	شەلەر
<i>Fritilarrria assyriaca</i>	TIREI-RÊWÎ	تەریی-رەوی
<i>Fumaria parviflora</i>	ŞÎRÎN ŞATERE	شیری ن شاتەرە
<i>Gagea dubia</i>	SIÇKOLE	سەچکۆلە
<i>Gagea reticulate</i>	GULE ESTÊRE	گۆلە ئەستێرە
<i>Galium aparine</i>	BELESKE-BELESKE-AFERÎNÎ-DUGUNE	بەلەسکە-بەلەسکە-ئافەرنی-دووگۆنە
<i>Galium haussknechtii</i>	NUSKE-NÛS	نوسکە-نوس
<i>Galium mite</i>	GYA NERIM-TIRZINE-DÛGUNE-TERZEN	تەرزەن-دووگۆنە-گیانەرم-تەرزەن
<i>Galium verum-subsp.glabrescens</i>	DÛGUNE-NUSKE	دووگۆنە-نوسکە
<i>Geum urbanum</i>	NABELEK	نابەلەک
<i>Gladiolus italicus</i>	SUSUN-GULEGEZÎZ	سوسونگ-گۆلەگەزیز
<i>Gleditsia triacanthos</i>	GLADÎŞYA	گەلادیشیا
<i>Glycyrrhiz glabra</i>	BELEK-MÊKÛK	بەلەک-مەیکۆک
<i>Gundelia tournefortii</i>	KINGIR	کەنگەر
<i>Gynandirs sisyrinchium</i>	BIZINTIRÊNE	بەز نەتەرنە
<i>Haplophyllum buxbaumii</i>	MÎZEMERE	میزە مەرە
<i>Helianthemum aegypticum</i>	CEREID -CERÎD-CEREIDÎ	جەرەید-جەرەید-جەرەیدی
<i>Helianthemum ledifolium</i>	GÎYA KHEŞKHAŞÛK	گیا خەشخەشۆک
<i>Helianthemum ledifolium</i>	WESIM-NAEA ŞIWANE	وەسەم-ئانەشوانە
<i>Helianthemum salicifolium</i>	ÇÎME-CERÎD-JEREIDÎ	چیمە-جەرەید-جەرەیدی
<i>Helichrysum laciocarpum</i>	QAPKEWELE-QAPEŞÎNKE	قاپکەوێلە-قاپەشەنکە
<i>Heliotropium noeanum</i>	QAPKEWELE-QAPEŞÎNKE	قاپەشەنکە-قاپکەوێلە
<i>Hesperis kurdica</i>	QAÇMUK-ŞEWBOR	قاچمۆک-شەمبوور
<i>Heterantheium piliferum</i>	GIRÎKÎTİK-KERKOKHÎNK-KERKHINKÊNE	گەری کەتک-کەزکۆخەنک-کەزخەنکە
<i>Hibiscus trionum</i>	CILCIL	جەلجەل
<i>Hirschfeldia incana</i>	KHERTELE-GIAZERDE	خەرتەلە-گیازەردە
<i>Hordeum spontaneum</i>	GULE BIRÛN	گۆلە برۆون
<i>Hordeum spontaneum</i>	COKÊWÎ	جۆکەوێ

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<i>Hordeum bulbosum</i>	QUMAME	قومامه
<i>Hordeum glaucum</i>	GÏZIR- COKÊWÎ	گیزر-جوکیوی
<i>Hordeum spontaneum</i>	GYA GENIME	گیانگنمه
<i>Hordeum vulgare</i>	CO	جو
<i>Hymenocarpus circinnatus</i>	QEREINE-SÛREHELALE	قهر مینه-سووره هه لاله
<i>Hypericum amblysepalum</i>	SÛRNATIK	سوور ناتک
<i>Hypericum lysimachioides.var.lysimaÇioides</i>	SÛRNATIK	سوور ناتک
<i>Hypericum lysimachioides.var.pathulatum</i>	SÛRNATIK	سوور ناتک
<i>Hypericum perforatum</i>	SÛRNATIK	سوور ناتک
<i>Hypericum scabrum</i>	GULEBARÛN-GULEJAN-BELBELAWA-GULEZERDE	گوله باروون-گوله ژان-بەلبە لاوا-گولەزەردە
<i>Hypericum triquetrifolium</i>	ZÛRNAYIK-REŞIK-ZÛRNATIK	زوور نایک-رەشک-زوور ناتک
<i>Hypericum virmiculare</i>	DERMANESÛRE	دەرمانە سووره
<i>Imperata cylindrica</i>	GISKE	گسکه
<i>Iris aucheri</i>	KEISBALÛK-SÊBISKE-GIZ BALÛK	کەیس بالووک-سەبەسکە-گیز بالووک
<i>Iris gatesii</i>	GULEHÊRO-GULHIRIÇ-GULMOIRE	گول هیزو-گول هیز چ-گولمۆیرە
<i>Iris. reticulata.var.reticulata</i>		
<i>Isatis lusitanica</i>	RIŞULK-KHARUL	ریشولک-خارول
<i>Ixioliron tataricum</i>	GULWANIK	گولوانک
<i>Jasminum fruticans</i>	YASEMÎNÎ KÊWÎ	یاسەمینی کیوی
<i>Juglans regia</i>	GWEZ	گوز
<i>Juncus bufonius</i>	ZEL	زەل
<i>Juncus fontanesii</i>	ZEL	زەل
<i>Juncus inflexus</i>	PÎSÛM-ZEL	پیسووم-زەل
<i>Lactuca undulata</i>	POLK KHATÛN	پۆلک خاتون
<i>Lactuca serriola</i>	TALLIK	تالیشک
<i>Lamium amplexicule</i>	RHANA KÊWI	رەحانە کیوی
<i>Lathyrus annws</i>	POLKE	پۆلکە
<i>Lens culinare</i>	NÎSKEKÊWILA	نەسکە کیویله
<i>Lens orientalis</i>	NÎSK	نەسک
<i>Lepidium chalepense</i>	TERETÎZE-TÊTÛRE	تەرەتیزە-تەتۆرە
<i>Lepidium sativum</i>	TERETÎZA-TÊTÛRE	تەرەتیزە-تەتۆرە
<i>Linum bienne</i>	KETAN	کەتان
<i>Linum strictum</i>	KETAN	کەتان
<i>Lolium rigidum</i>	PÎLÛLAK-AWMASIL-ILMUK-GIYA RÛTE-GIYAŞILE	پیللەک-ئاو ماسل-گیار و تە-گیاشلە
<i>Lolium temulentum</i>	ŞÊLIM-ZIWÂN-DANEWLE	شەلم-زیوان-دانەولە
<i>Lonicera arborea</i>	ŞIHÎN-ŞAN-ŞN-	شەین-شان-شون
<i>Loranthus europaeus</i>	BALAW-DEMOKE	بالاو-دەموکە
<i>Lotus corniculatus</i>	WÊNCE-SÊWERE-KINÊR	وینجە-سەوورە-کەنیر
<i>Lotus gebelia</i>	KINÊR	وینجە-سەوورە-کەنیر
<i>Malva neglecta</i>	TOLEKE	تۆلەکە
<i>Malva nicaeensis</i>	TOLEKE	تۆلەکە
<i>Medicago constricta</i>	SÊPERE	سەپەرە
<i>Medicago coronata</i>	SÊPERE	سەپەرە
<i>Medicago orbicularis</i>	METALÛK- SÊPERE	مەتالووک-سەپەرە
<i>Medicago sativa</i>	WÊNCE-YÛNCE	وینجە-یونجە
<i>Melica jacquemontii</i>	LARSENA	لارسەنا

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<i>Melica persica</i>	LARSENA	لارسنا
<i>Mentha logifolia</i>	PÛNGE	پوونگه
<i>Milium pedicellare</i>	PÛNGE	پوونگه
<i>Morus alba</i>	TUWE SIPÎ	توو هسپی
<i>Morus nigra</i>	TÛWE REŞ-ŞATW	توو رهش-شأتوو
<i>Nasturtium officinale</i>	KÛZELE	کووز لهه
<i>Nerium oleander</i>	JALLE	ژاله
<i>Nigella arvensis</i>	REŞKE	ر مشکه می کبوی
<i>Nigella oxypetala</i>	REŞKE	ر مشکه می کبوی
<i>Nigella sativa</i>	REŞKE	ر مشکه
<i>Notobasis syriaca</i>	ÇAWBAZE	چاوبازه
<i>Onobrychis caput-galli</i>	PÊKUL	پنکول
<i>Onobrychis crista-galli</i>	PÊKULE-QUNCIRKE	پنکوله-قونجیرکه
<i>Onobrychis megataphros</i>	PÊKULE-QUNCIRKE	پنکوله-قونجیرکه
<i>Ononis spinosa</i>	RIGULK	رگولک
<i>Onopordon carduchorum</i>	KERGUL-QALORE	کمرگول-قالوره
<i>Orchis anatolica</i>	GYIASALME-KANIL B Î BOLE	گیاسالمه-کانل بیۆله
<i>Orchis coriophora</i>	GYIASALIME	گیاسالمه
<i>Orchis palustris</i>	GYIA SALIME	گیاسالمه
<i>Orchis tridentate</i>	GYIA SALIME -SE'LEBE	سه-هلبه-گیاسالمه
<i>Orobanche aegyptiaca</i>	GYIA KELE-GURGE	گیاکمه-گورگه
<i>Orobanche kurdica</i>	GYIA KELE-GURGE	گیاکمه-گورگه
<i>Paliurus spina-christi var. macrocarpa</i>	DIRKA Z Î	درکیزی
<i>Paliurus spina-christi var. spina-Çristi</i>	DIRKA Z Î	درکیزی
<i>Papaver cylindricum</i>	GULLALLE SÛRE	گولاله-سورره
<i>Papaver dubium</i>	GULLALE AŞIQANE	گولاله ناشقانه
<i>Periploca graeca</i>	T ÎRAY MÂR-LAWLAW-MIYAMAWANE	تیره ی مار-لایو-میاماوانه
<i>Phleum boissieria</i>	JAI-QAM Î	ژای-قامیش
<i>Phragmites australis</i>	JAI-QAM Î	قامیش
<i>Picnomon acarna</i>	PIŞÎLE-BADAWER-DIRIK	پشیله-باداوه-دیرک
<i>Pistacia eurycarrpa</i>	QEZWAN-DARE BEN	قمزوان (دار مین)
<i>Pistacia khinjuk</i>	QEZWAN-WENEWŞÎLE-WENEMİŞİK	قمزوان-و نهوشیله-و نه میشک
<i>Pisum sativum</i>	POLKE	پۆلکه
<i>Plantago lanceolata</i>	RIKÊŞE	رکیشه
<i>Platanus orientalis</i>	SÛREÇINAR	سورره چنار
<i>Poa bulbosa</i>	NÂNI ŞÎVANI(Akre)--KERKHINKENE (sulaimani)	نانی شقانی (ناکری)- کمر خنکینه (سلیمانان)
<i>Populus euphratic</i>	PELLIK	پهلیک
<i>Prangos ferulacca</i>	LO	لو
<i>Prosopis farcta</i>	KHIRNÛK	خیر نووک
<i>Prunus amygdalus</i>	ŞEKREBAWÎ- HELÛJE-GUÇE	هملوژه-گه-شه-مکر هباوی
<i>Prunus arabica</i>	ÇEQALE- BADAM	بادام-چهقاله
<i>Prunus argentea var. argentea</i>	ÇIWALE- ÇEQALE - ÇIWALE TALE	چواله-چهقاله-چواله تاله
<i>Prunus carduchorum v. glabra</i>	ÇEQALE - BADAMÇE	چهقاله-بادامچه
<i>Prunus cerasifera</i>	HELÛJE	هملوژه
<i>Prunus kotschyi</i>	BADAM-BAWI- ÇEQALEY KÊWÎ	بادام-هباوی-چهقاله می کبوی
<i>Prunus microcarpa</i>	HALÛK-BELALÛK	هالوک-به-لایوک
<i>Prunus webbii</i>	ÇEQALE -BADAMEK-ÇIWALE	چهقاله-بادامهک-چواله

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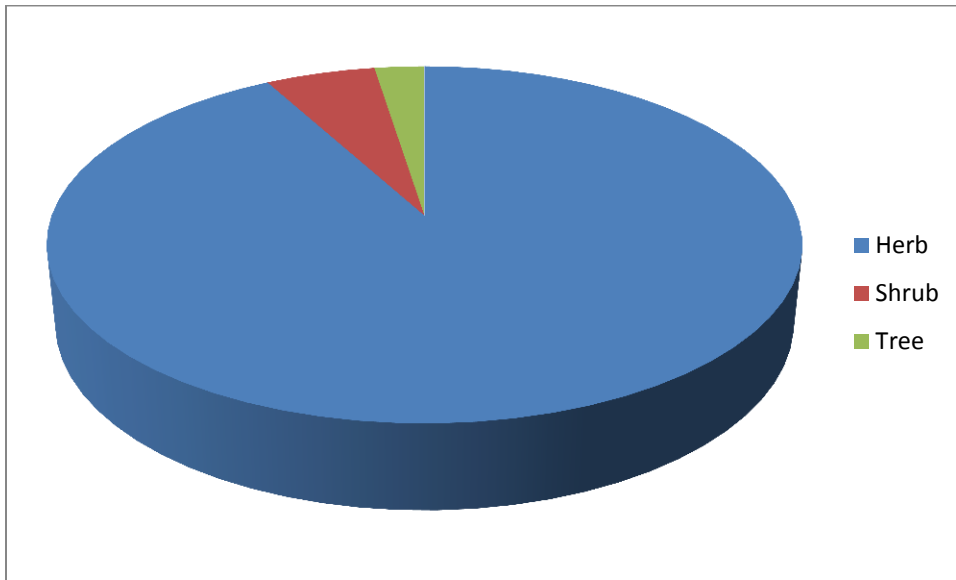
<i>Punica granatum</i>	HENAR	هەنار
<i>Pyrus communis</i>	HERMÊ	هەرمە
<i>Pyrus malus</i>	SÊW	سێو
<i>Pyrus syriaca</i>	KURSIK-HARMÎ-HERMÊ	کورسک-هەرمی-هەرمە
<i>Quercus aegilops</i>	BERÛ	بەرۆو
<i>Quercus infectoria</i>	MAZÎ-MAZÛ	مازی-مازوو
<i>Quercus libani</i>	BARÛ	بەرۆو
<i>Ranunculus arvensis</i>	NANÛKERE-PÊMIŞKE	نان و کەرەچین مەشکە
<i>Ranunculus asiaticus</i>	GULLE NÎSAN	گولە نەيسان
<i>Rhamnus cornifolius</i>	HANCÎRE REŞ	هەنجیرە رەش
<i>Rhamnus kurdicus</i>	SINCU	سەنجو
<i>Rheum ribis</i>	RÊWAS	رەئواس
<i>Rhus coriaria</i>	TIRŞ	تەرش
<i>Rosa canina</i>	ŞÎLAN-NESRÎN	شەیلان/نەسرین
<i>Rubus anatolicus</i>	TÛTIRK	تووتەرك
<i>Rubus sanctus</i>	TÛTIRK	تووتەرك
<i>Rumex scutatus</i>	TIRŞOKE	تەرشۆکە
<i>Rumex tuberosus</i>	TIRŞOKE	تەرشۆکە
<i>Salix acmophylla</i>	BÎ	بە
<i>Salix alba</i>	BÎ	بە
<i>Salix purpurea</i>	BÎ	بە
<i>Salvia trichoclada</i>	RÊHANE KÊWÎLE	رەیحانە کەئوولە
<i>Satureja macrantha</i>	HEZBÊ	هەزبە
<i>Schoenoplectus litroralis</i>	KEWLAN-ÇÛLAN-ZEL	زەل-کەولان-چولان
<i>Scorpiurus muricatus</i>	KILKE DÛPIŞKE	کەلکە دووپیشکە
<i>Scorzonera lanata</i>	HELEKOK	هەلەکۆک
<i>Secale montanum</i>	ŞELMÎ BERRÎ	شەلمی بەری
<i>Sinapis arvensis</i>	KHERDELE-KHERTELE	خەردەلە-خەرتەلە
<i>Sisymbrium septulatum</i>	ŞIRÎNŞATERE	شەئەرە شیرین
<i>Sonchus asper</i>	ŞÛROKE	شورۆکە
<i>Stellaria media</i>	GYABALLINDE	گەبابانندە
<i>Taeniatherum asperum</i>	GYAGÛLÎFK	گەگۆولیفک
<i>Taeniatherum crintum</i>	GYA GÛLÎFK	گەگۆولیفک
<i>Tamarix ramosissima</i>	GEZ	گەز
<i>Tamus communis</i>	TIRÊ MARANE	تەری مارانە
<i>Tragopogon longirostris</i>	ALEKOK-HALEKOK	هالەکۆک-ئالەکۆک
<i>Trifolium arvense</i>	SÊPERE	سەپەرە
<i>Trifolium campestre</i>	SÊPERE	سەپەرە
<i>Trifolium echinaatum</i>	SÊPERE	سەپەرە
<i>Trifolium hirtum</i>	SÊPERE	سەپەرە
<i>Trifolium nigrescens</i>	SÊPERE	سەپەرە
<i>Trifolium purpureum</i>	SÊPERE	سەپەرە
<i>Trifolium repens</i>	SÊPERE	سەپەرە
<i>Trifolium resupinatum</i>	SÊPERE	سەپەرە
<i>Trifolium scabrum</i>	SÊPERE	سەپەرە
<i>Trifolium spumosum</i>	WËNCE	وینجە
<i>Trifolium stellatum</i>	SÊPERE	سەپەرە

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<i>Trifolium tomentosum</i>	SÊPERE	سنيپيره
<i>Trigonella monantha</i>	WÊNCE	وينجه
<i>Trigonella strangulata</i>	WÊNCE	وينجه
<i>Trigonella monspeliaca</i>	WÊNCE	وينجه
<i>Triticum aestivum</i>	GANME KÊWÎ	گنمه كيوي
<i>Triticum dicoccoides</i>	GANME KÊWÎ	گنمه كيوي
<i>Tulipa systola</i>	GULWALAK-SORYAS	گولوالاک-سورياس
<i>Urtica dioica</i>	KEZÎNK-GEZÎNK	کمزینک-گمزینک
<i>Verbena officinalis</i>	GULE MÎNA	گوله مينا
<i>Vicia faba</i>	PAQLE	پاقله
<i>Vicia hybrida</i>	POLKE MARANE	پولکه مارانه
<i>Vicia narbonensis</i>	POLKE GAYAN	پولکه گایان
<i>Vicia sativa</i>	POLKE MARANE	پولکه مارانه
<i>Vicia tenuifolia</i>	MEJÛRD-POLKE	مجزورد-پولکه
<i>Viola modesta</i>	WENWŞE	ونهوشه
<i>Viola odorata</i>	WENWŞE	ونهوشه
<i>Vitex pseudo-negundo</i>	TERÛ	تاروو
<i>Vitis sylvestris</i>	MÊW	میو
<i>Vitis vinifera</i>	MÊW	میو
<i>Xanthium strumarium</i>	NWSEKE	نوسهکه
<i>Ziziphus jujuba</i>	ZÎZÎ	زیزی

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Appendix 5: The ratio of herbs, shrubs and trees in Hawraman region



یوخته

شاخی ههورامان یه کیکه له ناوچه گرنگه کانی کوردستانی عیراق و ناوچهی ئیرانی - تورانی، ئەم ناوچه یه که وتۆته رۆژه لاتی شاری سلیمانی به دووری 50 کم. له نیوان هیللی پانی $35^{\circ} 05' - 35^{\circ} 02'$ باکور، وه هیللی دریژی $45^{\circ} 53' - 46^{\circ} 11'$ رۆژه لاتی. به رزی شاخه که له نیوان 484م نزیك دەریاچهی دهر به ندیخان تا 2598م که له لوتکهی هانهی نه وه له باکوری دیی سه رگه ت، دریژی شاخه که نزیکهی 33 کم وه پانتزین ناستی نزیکهی 30 کم، وه روهه ری گشتی نزیکهی 660 کم² له کوردستانی عیراقدا.

ئەم تووژینه وه یه له نیوان سالانی 2011-2013 وه لیکۆئینه وه یه کی چرو پری روهه کی لوه یی ناوچه ی ههورامان کرا. له گه ل ئە نجامدانی کاری لیکۆئینه وه بو هه موو ئەو سه رچاوه زانستیانه ی که له سه ر روهه کی ناوچه که نوسراوه، له گه ل تاوتوی کردنی هه موو ئەو نمونه روهه کیانه ی که له پوشگه کاندان له ناوه وه و دهره وه ی عیراق. هه موو نمونه کۆکراوه کانی ئەم تووژینه وه یه ناساندرا، ژماره کرا، پۆلین کرا وه هه لگه راره له پوشگه ی فاکه ئتی زانسته کشتوکائیه کانی زانکوی سلیمانی (SUFA)، له م لیکۆئینه وه یه دا نزیك به 3500 نمونه ی روهه کی کۆکرایه وه، که سه ر به 135 ناوچه ی جیاواز، له 33 گه شتی زانستیدا، که زۆر به یان له 2-3 رۆژیان خایاندووه. بو خو پاراستن له دووباره کردنه وه و سه ر ئیشیوان له کاتی کۆکردنه وه ی روهه که اندا، هه ر جوړیکی روهه کی ژماره یه کی تاییه تی به به رده وای پیدراوه. بو هه ر کۆکراوه یه که ئەم زانیاریانه ره چاو کراون، هیللی پانی و دریژی، به رزی، میژووی کۆکردنه وه، شوینی کۆکردنه وه و زانیارییه ژینگه ییه کان. له هه ر کۆکردنه وه یه که دا وینه ی سه رانه سه ری بو زۆرینه ی جوړه جیاوازه کانی ناوچه که گه راره (سه یری سه ره وه که).

ریزه بندی نه لف و بی بو هه موو روهه کی که له خیزانیه وه هه تا ده گاته جیاوازی چه شنی، وه بو ناماده کردنی سنورداری خیزانه کان و ره گه زه کان سستمی میبه رلی (Mabberley) 2008 به کاره ی راره، سایتی توو دا پوشراوه کان به کاره ی نراو وه کورته ی ناوی پۆلینکه ره کان به پیی پیگه ی نه له کترونی IPNI کراوه.

نەم لىكۆلئىنەۋەيە 1084 رۈۋەكى گرتۆتەۋە كەلەمانەدا 951 كى بەدرىزايى سالانى 2011-2013. نەم لىكۆلئىنەۋەيە ھەموو رۈۋەكە ئوولەككە كانى ھەورامان دەگرىتە خۆى ۋە ھەروھا ئەوانەش دەگرىتەۋە كە ئەۋەۋپىش كۆكراۋنەتەۋە، سەبارەت بە ماۋەى ژيان، بونى ئە كىلگەدا ۋ كاتى گول ۋ بەروو تۆۋ، ھەروھا نەم لىكۆلئىنەۋە زانىارى سەبارىشى تىدايە ۋەك ناۋى ناۋچەيى، بەكارھىننى ناۋچەيى (بۇ نەموۋنە خواردن، دەرمان، ئامپىر، بەرگ ۋ پۆشىن، جوانى، تام، بۆن ۋ بەرام ۋ خواردەۋە)، تايىبەت بە ناۋچەى. نەم لىكۆلئىنەۋەيە 15 خىزانى رۈەكى ئەگەل 426 جۆر ۋەك زانستىكى نۆى دەخاتە سەر زانىارىكە كانى ناۋچەى ھەورامان، نەم لىكۆلئىنەۋەيەدا چوار جۆرى نۆى بۇ زانست دۇزرايەۋە *Ferula shehbaziana* (Apiaceae), *Onosma hawramanensis* (Boraginaceae), *Gypsophila sarbagiae* (Caryophyllaceae), and *Scrophularia sulaimanica* (Scrophulariaceae). ۋە 19 جۆرى تازە دەخاتە ناۋ فلۇراى عىراقەۋە كە ئەمانەن Apiaceae *Arum*) Araceae ، (*Trigonosciadium brachytaenium*) ، (*Heracleum persicum*) ، (*Alkanna orientalis*) Boraginaceae ، (*Filago eriocephala*) Asteraceae ، (*dioscoridis*) ، (*Silene coniflora*) ، (*Gypsophila caricifolia*) Caryophyllaceae ، (*Nonea ventricosa*) ، (*Centaurium meyeri*) Gentianaceae ، (*Schoenoplectus lacustris*) Cyperaceae ، (*Marrubium parviflorum*) Lamiaceae ، (*Nepeta nuda*) ، (*Fritillaria*) Liliaceae ، (*Bromus intermedius*) Poaceae ، (*Tulipa clusiana*) (*strausii*) ، (*Polygonum convolvulus*) Polygonaceae ، (*Polygonum hydropiper*) و (*Prunus lycioides*) Rosaceae .

نەم لىكۆلئىنەۋەيەدا 33 جۆرى تايىبەت بە كوردستان (Endemic) تۆمار كراۋە كە ئەناۋياندا سىيانىان (*Astragalustawilicus* ، *Sileneavramana* ۋە *Dionysiabornmuelleri*) تايىبەتەندىن بە ھەورامانى عىراق ۋ ئىران، ۋە زۆر ئە مەترسىدان بۇ ئە ناۋچون بە پىى لىستى سور ئەلايەن (IUCN). ھەورامان ئە 4 ناۋچەى رۈۋەكى جىاۋاز پىك دىت ناۋچەى دەشتايى شىدار نىكەى 264. ناۋچەى دارستان نىكەى 322 كم² ، ھىلى درەخت نىكەى 18 كم² ۋ كوشنە دىكاۋىبەكان يان ناۋچەى نىمچە ئەلپايىنى نىكەى 24 كم² ۋە نەم ناۋچانە يەك ئە دۋاى يەك رىژەى 44٪، 48٪، 3٪ ۋ 4٪ ئە رۈۋەرى گشتى ھەورامان پىك دەھىنن.

پووهكه نوله يه كان به شيويهه كي سهره كي برهتته نه پووهكه گياييه كان وه 92٪ پووهك ههورامان پيكدنين، وه دارو دهوهن 8٪ نه كوي گشتي، ريژهي هاوبه شي پووهكي نيوان ههورامان و نيوان 748 جوړه (70٪) وه ههورامان و تركيا 630 جوړه (58٪)، ههورامان و سوريا 318 جوړه (30٪).

الخلاصة

يعتبر جبل هورامان واحد من اهم المناطق النباتية في كردستان العراق، وكذلك المنطقة الأيرانية-الطورانية. و يقع شرق مدينة السليمانية بحوالي 50 كم، عند خط العرض (35° 05' - 35° 20') شمالاً و خط الطول (46° 11' - 45° 53') شرقاً، و بمدى ارتفاع عن سطح البحر 484 - 2598 م لبحيرة دربندخان و **هانهي نهوه** شمال قرية **سهركهت** على التوالي. وهو بطول 33 كم واقصى عرض 30 كم و بمساحة اجمالية 660 كم² تقريباً.

أستندت الدراسة الحالية على الدراسات الحقلية المركزة لنباتات هه ورامان وللفترة 2011-2013 مترافقة مع مسح مكثف للمصادر و اختبار العينات لمختلف المعاشب خارج العراق. كل العينات التي جمعت خلال الدراسة تم تشخيصها و ترقيمها و تصنيفها و ثم حفظها في معشب فاكلتي العلوم الزراعية/ جامعة السليمانية(SUFA). وقد تم جمع 3500 عينة عند 135 نقطة جمع خلال 33 جولة ميدانية، استغرقت الجولة الواحدة من يومين الى ثلاثة أيام غالباً. وتجنباً لتكرار والالتباس خلال عملية جمع البيانات فقد اعطي كل نوع رقم مميز من سلسلة مستمرة. حيث اعطي لكل عينة رقم، موقع الجمع (خطوط الطول والعرض)، الارتفاع عن مستوى سطح البحر، التاريخ ، أسم المنطقة، و المعلومات البيئية المسجلة، وقد تم التصوير بشكل مفصل لأغلب الانواع النباتية في مناطق جمعها. وتم الترتيب الأبجدي لكل المراتب التصنيفية من العائلة الى ادنى المراتب التصنيفية (ضرب)، باستخدام طريقة مبيرلي 2008 (Mabberley)، و موقع شعبة مغطاة البذور (Angiosperm) تتضمن أسماء المؤلفين حسب موقع IPNI.

و قد غطت الدراسة 1084 مرتبة تصنيفية، منها 951 جمعت خلال العمل الحقلي للسنوات الثلاث. أن هذه الدراسة شملت كل النباتات الوعائية لجبل هورامان، متضمنة كذلك العينات التي جمعت من قبل المصنفين السابقين.

تم تدوين المعلومات حول دورة الحياة، التكرار، و مرحلة النمو للنبات. فضلا عن ذلك فقد أشتملت الدراسة على معلومات اخرى، مثل الأسم المحلي، الاستخدامات الشعبية (الطبية، الغذائية و الصناعية). في هذه الدراسة تم إضافة 15 عائلة و 426 مرتبة تصنيفية سجلت لأول مرة الى قائمة الانواع النباتية المسجلة في جبل هورامان. كذلك اضافت الدراسة اربعة انواع جديدة للعلم، *Ferula shehbaziana* (Apiaceae), *Gypsophila sarbagiae* *Onosma hawramanensis* (Boraginaceae), (Caryophyllaceae),

Scrophularia sulaimanica (Scrophulariaceae) و 19 نوعاً نباتياً جديداً لفلورا العراقية وهي
 Araceae ، (*Trigonosciadium brachytaenium*) ، (*Heracleum persicum*) Apiaceae
 (*Alkanna*) Boraginaceae ، (*Filago eriocephala*) Asteraceae ، (*Arum dioscoridis*)
 (*Silene*) ، (*Gypsophila caricifolia*) Caryophyllaceae ، (*Nonea ventricosa*) ، (*orientalis*
Centaurium) Gentianaceae ، (*Schoenoplectus lacustris*) Cyperaceae ، (*coniflora*
 Liliaceae ، (*Nepeta nuda*) ، (*Marrubium parviflorum*) Lamiaceae ، (*meyeri*
 ، (*Bromus intermedius*) Poaceae ، (*Tulipa clusiana*) (*Fritillaria strausii*)
 (*Polygonum convolvulus*) Polygonaceae ، (*Linaria simplex*) Plantaginaceae
 (*Polygonum hydropiper*) و (*Prunus lycioides*) Rosaceae. كذلك شخصت الدراسة الحالية 33
 نوع مستوطن (Endemic) في كردستان منها ثلاث (*Astragalustawilicus* , *Sileneavramana*) و
 (*Dionysiabornmuelleri*) مقتصرة فقط في هورامان العراق و ايران وهي معرضة للانقراض بشدة
 حسب القائمة الحمراء (IUCN Red list).

توجد اربع مناطق نباتية مختلفة في هورامان: المنطقة الرطبة (حوالي 264 كم² تمثل تقريبا 44%
 من المساحة الكلية لـ هورامان)، منطقة الغابات (حوالي 322 كم² و تشكل 48% من المساحة الكلية لـ
 هورامان)، منطقة خط الأشجار (حوالي 18 كم² و تشكل 3% من المساحة الكلية لـ هورامان) و منطقة ثرن
 كوشن (thorn-cushion) او تحت الالبية (حوالي 24 كم² و تشكل 4% من المساحة الكلية لـ هورامان). ان
 النباتات الوعائية في هورامان تتكون بشكل رئيسي من 92% من الانواع العشبية، تليها الأشجار و
 الشجيرات 8% من مجموع النباتات. تشكل الانواع النباتية المشتركة بين هورامان و إيران حوالي 70%
 (748 نوع)، هورامان و تركيا 58% (306 نوع) و هورامان و سوريا حوالي 30% (318 نوع).

نباتات الوعائية لمنطقة هورامان في

كوردستان العراق

أطروحة مقدمة إلى
مجلس فاكولتي العلوم الزراعية – جامعة السليمانية كجزء من متطلبات نيل
درجة دكتوراه فلسفة في العلوم الزراعية- تصنيف النبات

من قبل

سامان عبدالرحمان احمد

بكالوريوس المحاصيل الحقلية 1998

ماجستير تصنيف النبات 2006

بإشراف

أ. د. احسان علي الشهباز أ. د. عذية ناهي سلمان المشهداني

جامعة بغداد

الحديقة النباتية ميزوري

پووهكه ئوولەپەكان ئە ناوچەى هەورامان

□ تیزیکە

□ پێشکەش بە ئە نجومەنى فاکەنتى زانستە کشتوکائیهکان / زانکۆى سلیمانى کراوه

□ وهك بەشیک ئە پپووستیهکانى بەدهستیهنانى پلهى دکتورای فهلسهفه

□ ئە زانستی کشتوکائی- پووهك پۆلینى

□

□

□ ئە لایەن

سامان عەبدول رەحمان ئە حمەد

□ بە کائۆریوسى بەرروبوومى کینگە 1998

□ ماستەرى پووهك پۆلینى 2006

□

□ بەسەرپەرشتى

پ. د. عذیة ناھى سلمان مشھدانی

□ زانکۆى بەغداد

پ. د. احسان علی شاباز

□ باخى پووهكى میزۆرى

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