



# **Ecologia**

ISSN 1996-4021



Academic  
Journals Inc.

[www.academicjournals.com](http://www.academicjournals.com)



## News and Views Article

# Traditional *Gundelia tournefortii* Usage and its Habitat Destruction in Tiran va Karvan District in Iran's Isfahan Province

Habib Yazdanshenas, Ali Tavili, Hossein Arzani and Hossein Azarnivand

Department of Range Management, Faculty of Natural Resources, University of Tehran, Iran

## Abstract

Kangar (*Gundelia tournefortii*) belongs to Rosaceae family that grows in rangeland and is used in many fields. This plant has a variety of minerals and is used in vegetarian dishes. But this plant like as other important plants may be threatened with extinction from over harvesting and should be protected. Therefore, the aim of this study is to identify the traditional use of this plant and survey the modern methods of harvesting that have caused habitat destruction and threatened the health of the plant in Karvan district, west of Isfahan province in Iran. This information has been obtained on the basis of objective observation and questioning local people. Studies indicate that *G. tournefortii* is grown in this region, even in farm lands and has several uses. Fresh stems and seeds of the plant are used to feed the people and to treat some diseases also. All parts of the plant at the end of growth period are used as the winter forage for livestock. The important thing is that when the plant is used by human, it is not used by animals. *Gundelia tournefortii* is important to soil and water conservation. But there are natural enemies such as insects and some harvest methods employed by humans have led to a degradation of the habitat of this plant. It is thus necessary to utilize better, environmentally-friendly methods of harvest this important plant. Also this is essential to use modern method to cultivation and propagation this plant, because of the importance and habitat destruction.

**Key words:** Plant use, kangar, rangeland, consumption, water conservation, environment friendly

**Received:** September 16, 2015

**Accepted:** November 28, 2015

**Published:** June 15, 2016

**Citation:** Habib Yazdanshenas, Ali Tavili, Hossein Arzani and Hossein Azarnivand, 2016. Traditional *Gundelia tournefortii* usage and its habitat destruction in Tiran va Karvan district in Iran's Isfahan Province. *Ecologia*, 6: 19-25.

**Corresponding Author:** Habib Yazdanshenas, Department of Range Management, Faculty of Natural Resources, University of Tehran, Iran  
Tel: +9809137546924 Fax: +982612249313

**Copyright:** © 2016 Habib Yazdanshenas *et al.* This is an open access article distributed under the terms of the creative commons attribution License, which permits unrestricted use, distribution and reproduction in any medium, provided the original author and source are credited.

**Competing Interest:** The authors have declared that no competing interest exists.

**Data Availability:** All relevant data are within the paper and its supporting information files.

## INTRODUCTION

Forestry and plant usage studying in different areas has gotten special importance. To study forestry in different areas of Iran has a fairly long background and so far the plant coverage of multiple zones in Iran was studied by researchers in floristic ways. Ethnobotanical study in the Eastern Riviera (Liguria, Italy) displayed that the most usage of plants is in the purpose of food, alimentary, medicinal, veterinary, domestic and cosmetic, magic and ritual and a few numbers of them are consumed in other purposes<sup>1</sup>. The useable parts in different proportions exist in different zones, in Gindeberet in the west part of Ethiopia, the significant part of plants tend to be used in food and medicines which consist: leaf, root, skin and fruits of plants<sup>2</sup>. Inta *et al.*<sup>3</sup> in four rural areas did some study on the traditional usage of plants and stated that the major consumption of plants has been for medicinal uses and more than a few species of area's plants have been exploited, the aboriginal knowledge of utilizing plants should be considered because the life style of people who live in the country is being changed. Generally speaking, about 15,000 medicinal plant species may be threatened with extinction worldwide from over harvesting<sup>4</sup>, which will cause a decline in the traditional use of plants due to the scarcity of species. This scarcity which is usually a result of human activities and also overgrazing, has become a critical issue during the last decades and needs our focus for conservation of these plants<sup>5</sup>.

However, the family Compositae is one of the largest families of flowering plants and includes about 1,000 genera and 20,000 species of plants around the world. Some species of this plant's genus are threatened around the world and especially in temperate regions. Genus Kangar (*Gundelia*) has numerous species such *Gundelia tournefortii*, *G. purpurascens*, *G. tenuisecta*, *G. rosea*, *G. glabra* and *G. aragatsi* that are similar to each other and the main way to identify them is differences in flower color and size. Kangar (Artichoke) (*Gundelia tournefortii*) is the most important and best known species. Most of the medicinal plants (such as, *G. tournefortii*) are collected in the wild and are often harvested for trade<sup>6</sup>, but in this area (Rangland in west of Isfahan province, Iran) *G. tournefortii* is harvest less for such goals. Also, there are several uses and important substance that is extract by new methods such as, hypolipidemic<sup>7</sup>, sterols and fat acid composition<sup>8</sup>, antioxidant<sup>9,10</sup>, atherosclerosis<sup>11</sup>, suitable for diabetes<sup>12</sup>. The purpose of this study is to survey the importance and traditional method used to harvest *G. tournefortii*, new problems related to excessive harvest and conservation of this plant in Tiran va Karvan district (west of Isfahan province in Iran). Any information and

knowledge about these resources is, therefore, important to protect them against unsustainable processes. Present data and information extract from a study which was conducted on plant use during 2011-2012 in the study area<sup>13</sup>.

**Artichoke field (*G. tournefortii*):** This herbaceous, perennial, wild plant has short branches which are shaped like a diadem. These plants have different names and population<sup>14</sup> in different areas such as artichokes, wild desert artichokes, artichokes and other names. Its hard downy leaves have rough edges<sup>15</sup>, making them slightly prickly. At the end of its lifetime, *G. tournefortii* develops hard tissue. The two sides of the leaves have different colors, above the surface is light and shiny while the underside is darker. The leaves are quite large and have red veins which are visible. Height may vary from about 20-80 cm depending on the amount of water available to the plant as well as nutrients and soil characteristics (Fig. 1). The plant's root is covered with several deep cellulosic layers that protect underground stems and roots in the hardest conditions of water stress. Of course, other than seedlings grown in air rootstock junction to under stem is very sensitive and is easily separated from the plant as well as at the end of the growing season, winds can carry them to another areas.

Many plants are edible exclusively and may be used only as a known species and used in traditional medicine. But *G. tournefortii* is an herb that is used in many applications and new application are being found by researchers every day. This herb has been used in traditional medicine around the word<sup>9,16-18</sup>.



Fig. 1(a-b): Fresh plants suitable for (a) Human consumption and (b) Food prepared from *G. tournefortii* (B)

**Vegetative spread:** *Gundelia tournefortii* grows in mountainous areas, i.e., mountain slopes and foothills; its geographical distribution, includes Iraq, Palestine, Turkey, Afghanistan, Iran, Turkmenistan and Republic of Azerbaijan<sup>7,15,17</sup> and other Caspian Sea and the Gulf of Oman. This plant has reproduces quickly once released on dry farming land. The species has an ability to grow in different soils (such as soils with low depth or high in lime content).

The seeds of this plant, even if they are not buried under the soil sufficiently, can sprout even with a minuscule, though adequate, amount of moisture in the soil and provided they have the chance to grow, they will become a fully grown plant. These plants can grow in a range of altitudes, but the normal height is 2200 m above sea level. Furthermore, this plant prevents soil erosion and sediments collected near harvest time and can be effective on wind speed.

The aim of this study is to present and highlight the traditional use of *G. tournefortii* by indigenous people in Tiran va Karvan district west of Isfahan Province in Iran.

**Characterize of study site:** Tiran va Karvan region is located 70 km far of west of Isfahan province in Iran (Fig. 2). The elevation of the area is 2080 m above sea level and annual rainfall is 250 mm, the average annual temperature is 15.2°C. The main surface of this area is covered by *G. tournefortii*.

The traditional usage information of this plant has been obtained according to objective observation and interviews.

***Gundelia tournefortii* usage items:** During the period of growth, the *G. tournefortii* is consumed mostly by animals rather than humans. In fact, the plant is suitable for human consumption very the early stages of its development.

In general, consumer groups of *G. tournefortii* include the following:

**Human consumption:** Each season has a particular cuisine and culture of regional nutrition that is generally called “food season”. There are some foods that are made using *Gundelia tournefortii* in this district. *Gundelia tournefortii* plant is the most important material peculiar to the season. *Gundelia tournefortii* is generally eaten raw or as a stew (Fig. 1-on the right). A variety of desserts, salad, stew and other healthy foods are prepared from this plant by the people in this region; foods which may look and taste rather different to other cuisines or food cultures. Some parts of this plant which are consumed by humans, include underground stems, leaves and aerial stems and the rootstock. When the fresh stems and seeds of *G. tournefortii* are so small and soft (at this time plant has no flower (Fig. 1) on the left), it will be harvested, at this time its stems are palatable.

The raw plant is commonly used with dairy products like yogurt. *Gundelia tournefortii* is also used by local people of the area as medication (Traditional medicine) to cure the sick. Because this plant has “cool” qualities, it is used to cure skin diseases and is beneficial in treating heatstroke.



Fig. 2: Geographical location of the study area (Tiran va Karvan district in west of Isfahan province, Iran)



Since long ago even toxic plants have been used in traditional medicine and considered by healers and philosophers as important in herbal medicine. Depending on the healing ingredients that are in various plants and herbs, they may have different medicinal properties. The higher the concentration of substances with medicinal properties in a plant, the higher the healing value. Ingredients such as plant nutrients, mucilage, tannins, saponins, volatile oils, resins and other materials and alkaloids which are usually plant do not need them and can be extracted from them for specific purposes.

As such, *G. tournefortii* is among the plants used in the prevention of some diseases and curing many diseases. Many medicinal properties that are common to plant artichokes are also true about the *G. tournefortii*.

People use the *G. tournefortii* seeds like most other grains. After harvesting the plant, in this district, seeds are cooked over a gentle heat so that the seed crust will be soft and the kernels become tasty, which are consumed like sunflower seeds. The seeds are collected during the summer and are used during the winter, but this tradition has been declining in recent years alarmingly. The seeds are very nutritious, however, because they are covered with thorns and cannot be used readily. Other than these main uses, the inflorescence can be also used for decorative purpose (Fig. 3).

important and valuable plant for animal, but there are other concepts in the region. Indigenous people for long periods of time, harvested the *G. tournefortii* in a particular time of year as winter forage for livestock and as it will be used and interestingly, when it did come with a mature plant and the seeds are ripe to incorporate the highest dry matter to collect plants or seed plant straw collected and a nutritional supplement is appropriate and nutritious for livestock (Fig. 4).

There are several plants that within the course of their lives for reasons such as fiber, excessive accumulation of salts, etc. are not be considered suitable for consumption and thus never put to use either for humans or animals, while many potentially useful plants lose their properties during their growing season and go begging as a result.



Fig. 3: *Gundelia tournefortii* seeds as refreshments and snacks are used often by local people in winter

**Livestock or other animals consumption:** According to most scientific sources, forage from *G. tournefortii* is not an



Fig. 4(a-d): Stages of (a) Harvesting, (b) Collecting, (c) Chopping and (d) the *G. tournefortii* as forage for livestock during the winter



Fig. 5: At the end of the season, livestock such as goats show great interest in dried plant especially plant seeds

Unlike most plants which do not appeal to livestock at the end of their vegetative period, often due to some mechanism in plant structure during their lifetime, the leaves and seeds of *G. tournefortii* remain palatable for grazing animals at the end of the season (Fig. 5) and many herd are feeding on this plant during autumn and winter which there are no plants else for livestock feeding.

*Gundelia tournefortii* is harvested in areas where jobs very much follow seasonal trends and people have little income. Not only is the plant a vital and nutritious foodstuff, it also feeds animals and aids the local community's economy. The plant is harvested for human consumption in spring and for livestock in summer.

## DISCUSSION

Today, having a healthy body which is free from disease is arguably difficult and one of the main reasons is inappropriate food habits. Furthermore, many medications produced in laboratories by chemists have well-known side effects. Plants which are used as food are an important part of a healthy diet and traditional plant use as food specially was reported by several previous researchers such as<sup>3,19-21</sup>. In this regards, indigenous knowledge has a great function in motivating the usage of plants and developing societies<sup>22</sup>. The empirical knowledge on traditional application of plants is progressively being lost, even faster than the process of plant extinction<sup>23</sup>.

One of the best ways to lead a healthy life is to eat "seasonal foods", while herbs have come to play an increasingly reliable role in curing various illnesses. However, *G. tournefortii* and other native plants possess certain

properties that make them uniquely adapted to local conditions, providing a practical and ecologically valuable alternative to other hazardous sources for food, animal feed and medicine. *Gundelia tournefortii* usage for animal food have not been reported before and should be document. *Gundelia tournefortii* can match the finest cultivated plants in beauty, while often surpassing non-natives in ruggedness and resistance to drought, insects and disease. Local people have been using *G. tournefortii*, but there are other potential uses for the leaves and seeds while the entire plant could be used as feed, its seeds could yield high quality edible oil.

*Gundelia tournefortii* consumption has no risk to human health. Mardaninejad *et al.*<sup>23</sup> reported this plant is using for blood fat, stomach tonic, clear intestine in the study area, Isfahan's Mobarakeh in Iran. In other study, Ebrahimi and Sani<sup>24</sup> mentioned *G. tournefortii* is used as food and medicinal purposes. The plant can also be cultivated artificially by seed although the seeds do have physical dormancy. But, *G. tournefortii* seed may be eaten by worms and insects infestation by various insects or other pests can prevent seed production on the plant in some years and create trouble in reproduction. The best solution to such problems will be *in situ* management, which is of the highest priority for any plant and in any field and which involves protection and management of wild sites that support threatened indigenous plants and communities. To this end, the actions which have to be undertaken include gathering baseline information, habitat protection, monitoring and recovery actions. Management options must take account of humans, plants and animals. Therefore, regular assessment (for example every 2 years) is required of the regional and national conservation status of all plant species and an assessment process is needed for indigenous plant communities, because surveying and monitoring of threatened plant populations is valuable for determining the status of species in the wild and documenting and interpreting change in condition over time<sup>25</sup>.

Tiran va Karvan region (Isfahan-Iran) with a small population and size boasts a variety of traditional methods to use plants, especially *G. tournefortii*.

But the advent of new techniques and technologies are posing a risk to traditional cuisines and medical practices.

Although, this plant is not among the native and specific species, because of its numerous uses, it needs to be protected. However, our ignorance becomes increasingly dangerous as the rates of loss of plants, wildlife and habitat accelerate<sup>26</sup> like *G. tournefortii*. One of the greatest benefits

of experimenting with native plants is their adaptation to local conditions. But it is important to select plants with growth requirements that best match the conditions in the area to be planted. Protection and maintenance of suitable habitats are the main options for management of threatened plant populations such as *G. tournefortii* as well as removal or mitigation of threats to survival of the species in any place and animal pest control, enhancement of existing wild populations, establishment of new wild populations to restore the former geographical that must be entirely evaluated. The culture of each area determines types and the ways of using plants.

### CONCLUSION

Knowledge on traditional usages of plants is progressively being lost and it is important to record traditional uses and indigenous knowledge on plant's utilization due the enormous change in locals livelihoods and lifestyles. The importance of such plants and their uses and the need for its conservation should be advertised to raise public awareness. Land managers, conservation and restoration specialists, landscape designers and private individuals must be encouraged to utilize local growers and nurseries that offer nursery-propagated native species, especially plants produced from local populations such as *G. tournefortii*. And, in the tragic event of the extinction of a species in the wild, the cause must be determined and necessary steps must be taken to address the issue to prevent such losses. Also the final solution is to domesticate, cultivate and propagation the important *G. tournefortii* species which is used for human and animal in different ways and other important plants that are endangered. Therefore, more attention is required to study, record, maintain and restore this cultural treasure for future generations.

### ACKNOWLEDGMENT

We would like to express our sincere gratitude to the people of Tiran va Karvan district for their help regarding the local knowledge and consumption of native plants.

### REFERENCES

1. Cornara, L., A. La Rocca, S. Marsili and M.G. Mariotti, 2009. Traditional uses of plants in the Eastern Riviera (Liguria, Italy). *J. Ethnopharmacol.*, 125: 16-30.
2. Zerabruk, S. and G. Yirga, 2012. Traditional knowledge of medicinal plants in Gindeberet district, Western Ethiopia. *South Afr. J. Bot.*, 78: 165-169.
3. Inta, A., P. Trisonthi and C. Trisonthi, 2013. Analysis of traditional knowledge in medicinal plants used by Yuan in Thailand. *J. Ethnopharmacol.*, 149: 344-351.
4. IUCN., 2007. Why conserve and manage medicinal plants? IUCN Species Survival Commission Medicinal Plant Specialist Group. <http://www.iucn.org/>.
5. Guruprasad, S.L., N. Ningaiah and M.R. Gangadhar, 2013. Indigenous knowledge on medicinal plants among the Iruliga tribal population of Western Ghats areas, Karnataka, India. *J. Anthropol.*, 9: 195-203.
6. Rokaya, M.B., Z. Munzbergova and B. Timsina, 2010. Ethnobotanical study of medicinal plants from the Humla district of western Nepal. *J. Ethnopharmacol.*, 130: 485-504.
7. Sharaf, K.H. and J.S. Ali, 2004. Hypolipemic effect of Kuub (*Gundelia tournefortii*) oil and clofibrate on lipid Profile of atherosclerotic rats. *Veterinarski Arhiv*, 74: 359-369.
8. Khanzadeh, F., M.H.H. Khodaparast, A.H. Elhami Rad and F. Rahmani, 2012. Physiochemical properties of *Gundelia tournefortii* L. seed oil. *J. Agr. Sci. Technol.*, 14: 1535-1542.
9. Coruh, N., A.G.S. Celep, F. Ozgokce and M. Iscan, 2007. Antioxidant capacities of *Gundelia tournefortii* L. extracts and inhibition on glutathione-S-transferase activity. *Food Chem.*, 100: 1249-1253.
10. Ozkan, A., O. Yumrutas, S.D. Saygideger and M. Kulak, 2011. Evaluation of antioxidant activities and phenolic contents of some edible and medicinal plants from Turkey's flora. *Adv. Environ. Biol.*, 5: 231-236.
11. Asgary, S., A.M. Atar, A. Badiei, G.A. Naderi, F. Amini and Z. Hamidzadeh, 2008. Effect of *Gundelia tournefortii* L. On some cardiovascular risk factors in animal model. *J. Med. Plants*, 7: 112-119.
12. Afifi-Yazar, F.U., V. Kasabri and R. Abu-Dahab, 2011. Medicinal plants from Jordan in the treatment of cancer: Traditional uses vs. *in vitro* and *in vivo* evaluations-part 1. *Planta Medica*, 77: 1203-1209.
13. Yazdanshenas, H., E. Shafeian, M. Nasiri and S.A. Mousavi, 2016. Indigenous knowledge on use values of Karvan district plants, Iran. *Environ. Dev. Sustain.*, 18: 1217-1238.
14. Vitek, E., G. Fayvush, K. Tamanyan and B. Gemeinholzer, 2010. New taxa of *Gundelia* (Compositae) from Armenia. *Annalen Naturhistorischen Museums Wien Serie B Botanik Zoologie*, 111: 85-99.
15. Karis, P.O., P. Eldenas and M. Kallersjo, 2001. New evidence for the systematic position of *Gundelia* L. with notes on delimitation of arctoteae (Asteraceae). *Taxon*, 50: 105-114.
16. Mirheidar, H., 2001. Introduction of Herbal Medicine. Vol. 1, Islamic Farhang Publication, Tehran, Iran, Pages: 240.
17. Jamshidzadeh, A., F. Fereidooni, Z. Salehi and H. Niknahad, 2005. Hepatoprotective activity of *Gundelia tourenfortii* J. *Ethnopharmacol.*, 101: 233-237.
18. Aburjai, T., R.M. Darwish, S. Al-Khalil, A. Mahafzah and A. Al-Abbadi, 2001. Screening of antibiotic resistant inhibitors from local plant materials against two different strains of *Pseudomonas aeruginosa*. *J. Ethanopharmacol.*, 76: 39-44.

19. Scherrer, A.M., R. Motti and C.S. Weckerle, 2005. Traditional plant use in the areas of Monte Vesole and Ascea, Cilento National Park (Campania, Southern Italy). *J. Ethnopharmacol.*, 97: 129-143.
20. Fisseha, M., 2007. An ethnobotanical study of medicinal plants in Wonago oreda, SNNPR, ETHIOPIA. M.Sc. Thesis, Addis Ababa University, Ethiopia.
21. Jeyaprakash, K., M. Ayyanar, K.N. Geetha and T. Sekar, 2011. Traditional uses of medicinal plants among the tribal people in Theni District (Western Ghats), Southern India. *Asian Pac. J. Trop. Biomed.*, 1: S20-S25.
22. Motaleb, M.A., 2010. Approaches to conservation of medicinal plants and traditional knowledge: A focus on the Chittagong Hill Tracts. International Union for Conservation of Nature, Bangladesh Country Office, Dhaka, Bangladesh, pp: 3-30.
23. Mardaninejad, S., M. Janghorban and M. Vazirpour, 2013. Collection and identification of medicinal plants used by the indigenous people of Mobarakeh (Isfahan), southwestern Iran. *J. Herbal Drugs*, 4: 23-32.
24. Ebrahimi, A. and A.M. Sani, 2015. Application of *Gundelia tournefortii* L. in yoghurt. *J. Applied Environ. Biol. Sci.*, 4: 266-272.
25. Sawyer, J.W.D., 2010. Bibliography of plant checklists and vegetation survey data for wellington conservancy (excluding Chatham Islands). Department of Conservation, 2nd Edition, March 2010, Wellington Conservancy.
26. Marinelli, J., 2005. *Plant: The Ultimate Visual Reference to Plants and Flowers of the World*. DK Publishing Inc., New York, USA.