Elderberry *(Sambucus nigra)* Distribution and Abundance in Syria

Mustafa Nur Istanbuly [1, 2]

1, Department of Environmental Sciences & Engineering, Faculty of Natural Resources, University of Tehran

2, Department of Renewable Natural Resources and Environment, Faculty of Agriculture Engineering, University of Aleppo

istanbuly@ut.ac.ir – steevanur@yahoo.com

Submission date:- 14/10/2018	Acceptance date:- 18/12/2018	Publication date:- 20/12/2018

Abstract

Elderberry (*Sambucus nigra*) is one of the important multiuse plants in the world. There is no studies about this shrub in Syria. In this study, information about this plant was collected from two sections: first in the whole world with collecting environmental needs and information about international distribution and abundance. In second way, sites that looked appropriate by using information from first section were chosen for looking about elderberry in Syria. Information, samples, photos, evidences and witnesses have been investigated for the first time about this species in Syria. Aleppo (City of Aleppo & Afrin province), Idlib, Homs and Damascus were sites have individuals in natural or cultivated form of this plant. Lattakia and Tartus didn't have any evidence of this plant. As a result of this study a predicted map of *Sambucus nigra* distribution was putted for Syria and collected information about this plant can help in future researches in Syria.

Keywords: Syria, Sambucus, Elderberry, Distribution, Abundance.

1. Introduction

Black elderberry has been noted to have been utilized as early as ancient Egypt. Ancient Egyptians found that black elderberry can be beneficial in improving the overall nature of the body and healing of burns. The ancient Romans also used the plant in the treatment of chest diseases (book chest medicine in the population of the Roman country) [1]. In England, many black elderberries were planted near huts to protect the population from lightning and witchcraft. Its branches were used in multiple ways. In the stables, they were often designed in the form of a crucifix to avoid bad omens. Drivers of vehicles carried a whip made of the elderberry wood as protection against spirits and death. The branches were also buried in graves to protect the dead from evil spirits [1].

1.1. Current Names

Elderberry has many local names in many languages; Table (1) shows different names of (Sambucuc nigra) in some languages.

Table (1); different names of *Sambucus nigra* in different languages

Language	Names
English	Black elder, Common elder, Elder, European elder, Europe elderberry, Judas tree, Pipe tree, Devils eye, Lady elder, Tree of doom & Old lady
French	Sureau, Sureau noir, Seu
German	Schwarzer Hollander
Portuguese	Sabugueiro Negro
Spanish	Sauco, Sambugo
Swedish	Flader, Flikflader
Italian	Sambreo, Sambuco
Russian	Busine, Buzian cornea
Polish	Bezczarny, Dzikibes czarny
Czech	Bezcherny
Arabic	Al-Bailasan, Al-Bailasan Al-Aswad, Al-khomman.

1.2. Plant Classification

The family, Caprifoliaceae, includes about eighteen Genus and four hundred species [2], mostly in temperate northern regions and tropical mountains. The genus, Sambucus L., contains about forty species [2] spread in temperate regions, but not in Central and South Africa. .The full taxonomy of Sambucus nigra is shown in the table (2);

Table (2); Full taxonomy of *Sambucus nigra.*

Kingdom	*Plantae*
-	*Tracheobionta*
-	*Spermatophyta*
-	*Magnoliophyta*
Class	*Magnoliopsida*
-	*Asteridae*
Order	*Dipsacales*
Family	*Caprifoliaceae*
Genus	*Sambucus* L.
Species	*Sambucus nigra* L.

1.3. Description

The black elderberry is a rapidly growing, dense shrub, sometimes a small tree (falling leaves). It grows up to 8-10 m high with a round crown, usually with several main trunks resulting from parcels that appear directly from the base of the tree. The parcels cause it to be strong and erect. The branches usually curve at maturity, figure (1) [3], and figures; (2, 3, 4, 5, and 6) which were taken for this study in Syria show perfectly the different parts of plant. The main purpose of this figures is to record this form of plant in Syria.

Figure 1: The different parts of the black elderberry (*Sambucus nigra* L.) [3]

Figure (1) shows plant parts [1- leaves, 2- flower, 3- petal (corolla), 4- filament (stamen), 5- pollen, 6- yellowish rose, 7- flower buds, 8- ovary, 9- fruit cluster, 10- fruit, 11- cross section in fruit (seeds placed), 12- Broad-seeded seed, 13- deep-cut seed, 14- cross section in seed, 15- a longitudinal section in the seed indicates the position of the embryo [3].

Figure 2: The full shape of the black elderberry tree. (photo by author, 2011)

Figure 3: The shape of the black elderberry trunk and bark. (photo by author, 2011)

Figure 4: The shape of black elderberry branches and small lentils on it (photo by author, 2011)

Figure 5: The shape of the black elderberry buds (photo by author).

Figure 6: It is a part of the flower bouquet which appears in the image and flower and its external parts also appears some unopened bronchial buds (photo by author)

1.4. **Genetic characteristics:** The number of chromosomes in the black elderberry is 2n=36. Natural hybrids of the plant are very rare. The hybrid between *S. racemosa* and *S. Nigeria* is recorded in several locations from Denmark and Sweden [4]. This may be due to the fact that *S. racemosa* appears to bloom several weeks earlier than *S. Niger* [5].

1.5. Environmental needs and Habitat

The black elderberry desires a plentiful source of hydration. This plant can grow in wet or dry soil conditions and prefers moderate sunlight. It is found in a wide range of areas, including fertile soil, low lands, open areas, land collection, roads, forests, water drains, railways, grasslands, and burial grounds. The cold temperature is fine for it as well as high temperatures. Also, slightly dehydrated and annual rainfall which is less than 500 mm per year.

The species often lives in lowlands and low mountain foothills and is limited 1,550 meters above sea level in the Alps in Europe, 2,200 meters on the mountains Atlas in Africa, and 2,300 meters in the Puntos Mountains of Asia. It has the ability to regenerate quickly if it is cut off. It is as a shade-tolerant plant. However, according to [6], black elderberry is not easily grown if was planted in the heavily shaded environments.

1.5.1. Air temperature

- Minimum temperature: - 39° C
- The average temperature range: 4 - 20° C
- The average highest temperatures range in summer: 15° - 31°C
- The average lowest temperature range in winter: 7 - -17°C

1.5.2. Precipitation

Table (3) shows; the number of consecutive months with rainfall less than 40 mm and lower or higher limits (min or max rate).

Table (3); minimum and maximum precipitation needs of *Sambucus nigra*

	Maximum limit (rate)	Minimum limit	
Number of consecutive months with rainfall less than 40 mm	0	0	Drought season
Lower or higher limits (min or max rate)	1800	400	Average precipitation

1.5.3. Soil

Elderberry has an ability to grow in wide types of soil. Heavy and moderate texture makes no problem for S. nigra. The pH of soil also makes no difference; the plant can grow in acidic soils and alkaline soils. Obviously, soil texture, pH, type, and contamination of nutrition elements have impacts on growing rate of elderberry.

2. The importance and objectives of the study

Locally studies that feature the black elderberry in Syria are lacking, if not rare. There is very little interest in this plant in Syria, which is ever present in our region and adaptable to its climate. The objective of this study is to show case the existing of this plant in Syria and investigate evidences of its natural distribution and abundance.

3. Methodology

3.1. Studied Area

Studied area was in the places with good environment for growing and existing of Sambucus nigra. In Syria the best Environment for existing of this plant was in the west center section of it. From north to south area had been checked for distribution and abundance of target plant. In many cases lack of sponsoring and no previous researches on elderberry in Syria and the large size of investigating area, were reasons to make this study in high levels of hardness. The figure (7) shows studied area and target places.

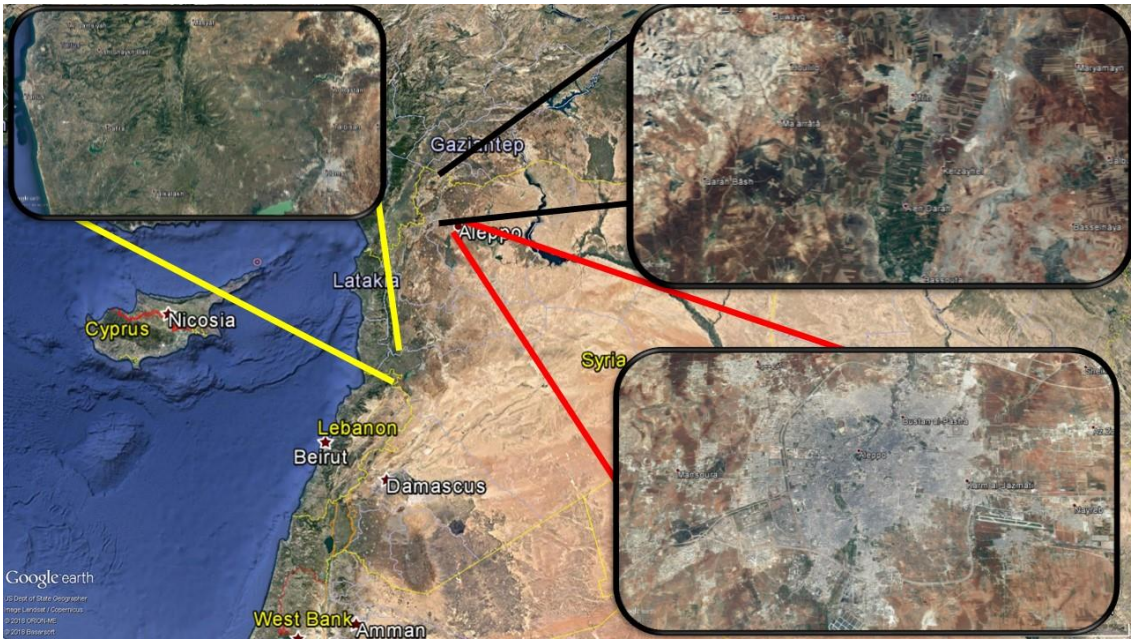

Figure 7: Studied area of *Sambucus nigra* in Syria by using google earth

3.2. Study on origin and spread in the world

The plant spreads over a wide range, table (4), between 63 degrees north latitude and 34 degrees south latitude. According to the US Department of Agriculture [7], the plant's native habitat is in the following areas:

Table (4); *Sambucus nigra* origin and spread in the world

Region	Country
Africa	Tunisia - Algeria
Moderate Asia	Iran - Iraq - Turkey (West Asia).
Caucasus	Armenia - Azerbaijan - Georgia - Dagestan - Caucasus
Asian Asia (Northwest India)	Northwest India - Jammu and Kashmir
Europe	Northen Europe: Denmark - Finland - Ireland - Norway - Sweden - United Kingdom.
	Central Europe: Austria - Belgium - Czechoslovakia - Germany - Hungary - Netherlands -Poland - Switzerland
	Eastern Europe: Belarus - Moldova - Federal Russia in the European part- Ukraine
	Southern Europe: Albania - Bulgaria - Yugoslavia - Greece - Italy - Romania
	Southwest Europe: France - Portugal - Spain.

According to the US Department of Agriculture's website the black elderberry is naturally spreaded in Syria but there is no information about it. The plant is a gateway to various parts of North America and South Africa, Africa, Asia and Australia. (Owen, 1996) Some of the seized records indicate that it entered New Zealand in 1867 [8].

3.3. Study the deployment and spread (distribution and abundance) in Syria

The black elderberry is planted in public parks as well as private gardens in Syria. It observed in the public park and the (Bab al-Nayrab) near of Aleppo city. It also had been monitored in a large number of private home gardens in the governorate of Aleppo, especially the area of (Afrin). As for the rest of the provinces, Aleppo province, it was mentioned by the people who owned this plant which they came from (Idlib) province, where they saw it in the Idlib forests. They also reminded that the black elderberry is planted in some gardens of Damascus and Homs. Studied plant observed, in fall of 2011, within the chestnut forest in the province of Homs, where at that time the plant had leaves with a little reddish color.

It is noted in the context of this study that the plant requires high amounts of water. It is known to spread its vegetation toward a water source as to compensate for the rise in temperature during the summer season. That is, if lifted in the natural state, it follows the behavior of the near streams plants.

In Aleppo governorate, plant was monitored in the most villages of Afrin.It was observed in its cultivated farm, because of the severity of the local population's appreciation for it, as in the town of (Bulbul) (Fig. 8). In most of the gardens as its home, as well as on the sidewalks as its streets, people use its fruit as food and making juice, and they got the seedlings from their friend’s farmers in the Idleb governorate. It was also spotted in Basutah (Figure 9) and in Kurzen near Qustal Maaf.

Figure 8: It shows a bush planted with black elderberry in private garden within a house, Town of Bulbul, Afrin district, governorate Aleppo (by author, 2011)

Figure 9: Sambucus nigra, bush appears at the time of the blossom (by author, 2011).

In the city of Aleppo, the local peoples confirmed that the plant was located on the edge of the Quiq River, and it was also mentioned that it was cultivated in the old houses of Aleppo. As the search was continued, S.nigra was monitored in several scattered individual plants in the area behind the Hal market.

At the Aleppo pistachio market, individuals of study plant had a large, long and huge stem, but it was cut off a thirty years ago, and just it shuts were on cut stem. These individuals have been buried in about two meters of building rubble, but despite this, some individuals have compensated and risen to follow their growth over the soil. (Figure 10)

Figure 10: Black elderberry bush in the square behind the Hal market, (by author, 2011)

While, the study went forward, questioning of many local peoples about existence of study plant in this area, they indicated that they have known this shrub in center of Aleppo; they asserted that the black elderberry had been presented in the region for hundreds of years. To prove the existence of the plant, and to find any remaining trace, it was found under precise investigation on two individuals in a nursery on Quiq River bed, in the area in front of Bustan Al-Qasser (Fig. 11). It was about 15 years old, but the land owner (agricultural engineer Mr. Joseph Slo) mentioned that the plant has never produced fruit. By Continuing to investigate other older individuals, a tree was founded which located south of the two previous trees were near the boundary of the road in the orchard of Mr. Hassan Mkais, and were buried about one and a half meters of its trunk (Figure 3), and its perimeter was about 25 cm, with two branches or two main axes, four meters high and had aged with more than seventy years old.

Figure 11: *Sambucus nigra* in Bustan Al-Qasser. (by author, 2011)

According to the owner of the orchard, the tree was present when his grandfather was born. This was confirmed by Joseph Slo. The study attempted to reveal the main stem of the tree in the possibility of investigation and identification, but it was clear that the main stem was embedded in the construction dust in a way that made impossible to reach. This is in addition to being broken and having two main branches. It was also mentioned that the plant existed wilderness on the edges of the river with native peach trees.

As the search continued, several individual plants were monitored along with the peach trees. When the investigation toured all the private nurseries in the city of Aleppo (Figure 12), wrongly the species (Viburnum) was identified in some nurseries as elderberry.

In the market of 'Al-Attarin (the popular and medical herb market in Al-Madina, Aleppo old City), parts of the plants were not sailed and the sailors had not known about the plant. As the search in Aleppo was continued, in the city of Aleppo, only some of the workers in a certain number of pharmacies identified studied plant. They were agricultural engineers, but they confirmed that plant parts are not available in pharmacies. They emphasized the importance of medicinal plants and knew the importance of each part of the plant, but they apologized for the lack the plant.

Figure 12: A black Elderberry tree appears in the public park in the city of Aleppo. (by author, 2011)

4. The Results and discussion

For the end of this study, which took two years, the shrub elderberry of as its name in local language (al-bailssan), had been a natural distribution plant because in the most cases of investigation, the plant had a self-care statue. It is true that elderberry in many cases of observation has been planted in Syria but also it's observed in natural forests in Homes and Idlib. In Aleppo City people confirmed existence of Sambucus for 200 years and older, the environmental factors like temperature fluctuation, moisture, presentation, soil etc are appropriateness to existing elderberry naturally and distribution in Aleppo, Homes, Idlib and Damascus. In other words; the distribution of this plant is in its international environments (Aleppo, Homes, Idlib, and Damascus) which have a moderate climatic conditions, but in west of Syria the plant was not observed (Lattakia, Tartus), which have Mediterranean environmental conditions (high moisture, high temperature). Although this spices have a wide distribution, but small abundance; in the most distribution areas, just a small number or even a fingers counted individuals was existed (Figure 13).

Unfortunately, local awareness about this plant does not exist. In most cases the plant was saved for its memory not for its uses and benefits, anyway the study of its benefits most be more in Syria. Furthermore, studies on its cultivation and planting should be took a place in planting plans for all plants nurseries in Syria. With this forgotten plant, Elderberry must be getting more care and more attention.

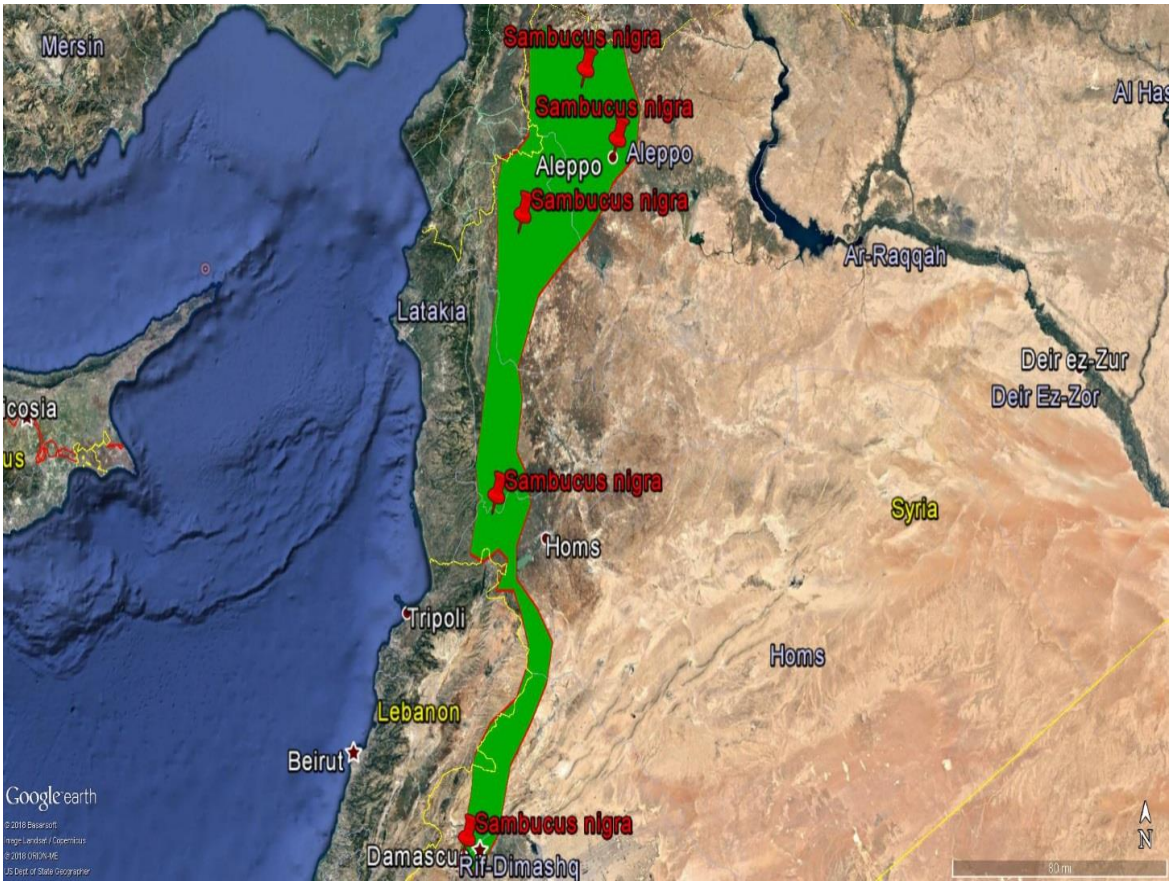

Figure 13: Show the predicted distribution of *Sambucus nigra* in Syria as observed from current study.

Acknowledge

Special thanks and all appreciation to Engineer M.B. Istanbuly Expert Agricultural Engineer, for his help in the field and for his expert in recognizing sites for our investigation.

CONFLICT OF INTERESTS.

- There are no conflicts of interest.

References

[1] Anonymous, "Herbalpedia Mother Nature's Herbal Resource Guide," Herbalpedia™, 13 9 2011. [Online]. Available: https://www.herbalpedia.com/elder.pdf.

[2] H. GAUSSEN , J.-F. LEROY and P. OZENDA , Précis de botanique. 2- végétaux supérieurs (in french), Editions Masson, 1982.

[3] M. Grieve, "Botanical a Modern Herbal," 15 7 2018. [Online]. Available: https://botanical.com/botanical/mgmh/e/elder-04.html.

[4] L. Mossberg and L. Stenberg, "Den nordiska floran. (The Nordic Flora). – Wahlström and Widstrand. Priedītis N. 2002. Melnais plūškoks Sambucus nigra L," *Enciklopēdija Latvijas daba,* 2003.

[5] M. D. Atkinson and E. Atkinson, "Sambucus nigra L.," *Journal of Ecology*, vol. 90, no. 5, pp. 895-923, 2002.

[6] J. KOLLMANN and S. A. REINER, "Light demands of shrub seedlings and their establishment within scrublands," *Flora*, vol. 191, pp. 191-200 , 1996.

[7] USDA NRCS National Plant Data Team, "https://www.usda.gov/," U.S. DEPARTMENT OF AGRICULTURE, 18 11 2011. [Online]. Available: https://plants.usda.gov/core/profile?symbol=sani4.

[8] S. Owen, "Ecological weeds on conservation land in New Zealand: a database," Department of Conservation, Wellington, 1996.

الإنتشار والكثافة للبيلسان الأسود (*Sambucus nigra*) في سورية

مصطفى نور استانبولي[1،2]

1. قسم علوم وهندسة البيئة، كلية هندسة الموارد الطبيعية، جامعة طهران

2. قسم الموارد الطبيعية المتجددة والبيئة، كلية الهندسة الزراعية، جامعة حلب

istanbuly@ut.ac.ir – steevanur@yahoo.com

الخلاصة

البيلسان الأسود أو كما يسمى بالعلمي (*Sambucus nigra*) هو أحد النباتات متعددة الاستخدامات المهمة. المعلومات عن هذا النبات في سورية غير موجودة أو ضحلة جداً. في تحقيقنا الحالي تم جمع المعلومات عن هذا النبات بقسمين: الأول عبر كل العالم وذلك بجمع المعلومات عن احتياجاته البيئية والإنتشار والكثافة عبر العالم. من الناحية الثانية تم انتخاب المواقع التي بدت ملائمة وذلك بالاستفادة من القسم الأول من المعلومات للبحث عن هذا النبات في سورية. تم التحقيق في المعلومات والدلائل والشواهد والصور والعينات عن هذا النوع في سورية. امتلكت حلب (مدينة حلب ومنطقة عفرين) وادلب وحمص ودمشق افرادا من هذا النوع سواء اكانت بصورة طبيعية يا بصورة مزروعة. لم تمتلك اللاذقية وطرطوس أي دليل على وجود هذا النبات. كنتيجة لهذا البحث تم وضع خارطة تنبئية لإنتشار البيلسان الأسود في سورية وجمع كمية من المعلومات التي قد تساعد في الأبحاث المستقبلية عن هذا النبات في سورية.

الكلمات الداله: سورية، *Sambucus*، البيلسان، الإنتشار، الكثافة.