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RESEARCH ARTICLE

**STUDY ON PRESENT STATUS, DISTRIBUTION AND FACTORS AFFECTING POPULATION OF
SAVADORA OLEOIDES DECNE IN HARYANA**

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ABSTRACT

This investigation describes the present status, distribution and various factors affecting growth of *Salvadora oleoides* Decne in Haryana. Population survey was carried out based upon questionnaire method. 150 people in the age group of 20 to 65 years from educational background were involved in questionnaire. Survey concluded the high risk of extinction of *Salvadora oleoides* in all the districts. Risk was observed due to anthropogenic disturbance and destruction of the natural habitat of the species. Besides this invasion by exotic species was also a major cause of decline in population of *Salvadora oleoides*. Present investigation reported that *Salvadora oleoides* was present as dominant species only in some groves situated in south west districts of Haryana. *Salvadora oleoides* in Haryana is now characterized by restricted distribution only in some major groves.

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INTRODUCTION

Salvadora oleoides Decne is a species which is declining very rapidly due to over exploitation, anthropogenic disturbance and loss of habitat. *Salvadora oleoides* has immense value in arid region. *Salvadora oleoides* Decne is indigenous to South Asia and is distributed in the arid tracts of the Punjab, Haryana, and Gujarat, Madya Pradesh, Rajasthan and south-western parts of Utter Pradesh. It is locally known as Chhotapilu, Jhal, Meetha Jhal, Pilu etc. This species has a great economical as well as ethno-medicinal value. Wood is used in building purposes and making of agricultural implements. Leaves of *Salvadora oleoides* are used to relieve cough and are given to horses as purgative. Fruits are sweet and edible. The fruits of *Salvadora oleoides* are eaten locally and the pulp contains glucose, fructose, sucrose and is a good source of calcium (Duhan et al., 1992). Fruits are fed to cattle to increase the milk yield. Fruits are also used in the treatment of enlarged spleen, rheumatism and low fever. Seeds of *S. oleoides* are rich in non edible oil as characterized by high amount of myristic acid.

Seed fat is used in the treatment of rheumatic pains (Anonymous, 1972). Purified oil is used in soap and candle making as well as in detergent industries as a substitute for coconut oil. Two - three decades ago, *Salvadora oleoides* Decne was widely distributed in Punjab, Haryana and Rajasthan (Bhandari, 1978). This species is decreasing very rapidly due to over exploitation, indiscriminate collection, low rate of seed set, poor viability and inefficiency to propagate by vegetative means (Khan, 1997; Khan and Frost, 2001 ; Singh, 2004). It was in abundance in community land in villages, along the road side and in agricultural fields. In recent, population of this species has reduced to a critical level in Haryana. That was why our main focus had been concentrated on *Salvadora oleoides*. The present paper is a part of vast project related to *Salvadora oleoides* which includes population survey, factor affecting growth and development, seed germination and vegetative propagation studies (Kumar et al., 2014a), *in vitro* regeneration studies using different explants like shoot tip of mature tree (Laura et al., 2012), cotyledonary node explants (Singh et al., 2012), nodal explant (Kumar et al., 2014b). Therefore present work deals with the various aspects of present status, distribution and factors affecting population of *Salvadora oleoides* Decne in Haryana.

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MATERIALS AND METHODS

Present investigation was carried out on *Salvadora oleoides* belonging to family Salvadoraceae to do population survey and to find out various aspects of anthropogenic disturbances. Population survey was made based upon Questionnaire method (Singh, 2004). 150 people in the age group of 20 to 65 years from educational fields were involved in questionnaire (Table-1). A questionnaire was given to each person to assess the present status of the species. 15 people were given questionnaire from each central and south-west district viz. Rohtak, Jhajjar, Jind, Bhiwani, Hisar, Rewari, Mahendergarh, Faridabad, Gurgaon and Mewat to know the present and past distribution in the region. Selection of these districts was due to the fact that this plant was distributed widely in the recent past in arid and semiarid regions of Haryana. Informations were collected on various points like habit, habitat, time of flowering and fruiting, general and medicinal uses of plant, possible risk to species and reason for the same, conservation priorities etc. Multiple visits were made to know the present as well as past status of this species. Informations were not collected from the districts of G.T. road belt and along the areas of Yamuna river corridor because while observing personally through a short preliminary visit, not a single plant of *Salvadora oleoides* was reported. So it was assumed that this species was critically endangered or near extinct along Yamuna river corridor. So the main focus was on south west districts of Haryana. The questionnaire was prepared in such a way that it can draw information from the people about the status of *Salvadora oleoides* Decne in Haryana. Following criteria was adopted for classification of plants in to Red List Categories of IUCN, 1997 in the state of Haryana.

1. When 25% of the interviewees concluded *Salvadora oleoides* at risk, status was considered indeterminate.
2. 50% interviewees reported, it is rare.
3. 75% interviewees reported, it is vulnerable.
4. 85% interviewees reported, it is endangered.
5. 100% interviewees reported, was considered at risk of extinct.

Table 1. Sample of questionnaire

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1. Common name of plant
 2. Habit of plant
 3. Time of flowering and fruiting
 4. Colour and taste of fruits
 5. General (folklore) and medicinal uses of plant
 6. Present status of plant (in interviewees opinion)
 7. Conservation priorities— no /yes /high
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Various anthropogenic factors were observed regularly responsible for decline in population of *Salvadora oleoides*. Efforts were made to find out various threats to this plant at various stages of its life cycle by interacting with local people. Multiple visits were made in areas characterized by high population of *Salvadora oleoides* Decne. Regular observations were also made to explore the possible risks to this species in different seasons.

RESULTS

During present investigation population survey was carried out to find out the status and distribution of *Salvadora oleoides*

Decne in the state of Haryana. Survey confirmed the high risk of extinction of *Salvadora oleoides* in all districts (Table-2). Various threats were reported time to time which were responsible for decline in population of this species due to loss of habitat. It was reported that Camels, Sheep and goats eat leaves, preventing natural regeneration of this plant throughout the year and especially during flowering season.

Some villagers harvest aerial branches for building material and fuel wood prior to flowering season and during flowering season. That was why many plants of *Salvadora oleoides* were not found to produce flowering. Local people were reported to cut tree and primary branches for fuel, timber purpose and to clear space for making houses and animal sheds. According to local people, excessive harvesting of trees for fuel is necessary as farmers are more interested in growing cash crop rather than fuel yielding leguminous crops like *Sesbania sesban*. However, Cotton being a cash crop is also a good source of domestic fuel.

That is why, *Salvadora oleoides* and other plants grown in village community land were not reported to harvest for fuel wood with a higher rate in such regions where cotton was being cultivated. This secret was divulged by farmers of villages Lajwana, Baroda, Igrah, Barhamavas (Distt. Jind), Gulkani, Mirchpur, Kanoh (Distt. Hissar), Kheri-Meham, Sanghi, Bhaini-Mato (Distt. Rohtak), Chimni (Distt. Jhajjar), Modi, Makdana and Balkara (Distt. Bhiwani). Various highway and power plants projects, urban development project etc. need a large amount of mining and filling work on the sites of project as well as nearby areas as their fundamental requirements.

Table 2. Distribution of population of *Salvadora oleoides* Decne in south west and central districts of Haryana

Districts	Status of threats in respective District	Conservation Priorities based upon questionnaire
Rohtak	Rare	High
Jhajjar	Rare	Medium
Jind	Rare	High
Bhiwani	Rare	Medium
Hisar	Rare	High
Rewari	Rare	Medium
Mahendergarh	Rare	Medium
Faridabad	Endangered	Very high
Gurgaon	Endangered	Very high
Mewat	Rare	High

Such works may lead to reduction in population of slow growing native species. It was reported that similar factors were responsible for decline in population of not only *Salvadora oleoides* but also many other species in Matanhel and Salhavas blocks (Distt. Jhajjar) and in Dadri sub-division (Distt. Bhiwani). So in nutshell it can be concluded that *Salvadora oleoides* is under various threats. Urbanization has put further pressure on population and has destroyed the natural habitat as raw material required for urbanization is brought from rural areas and natural forest. Another threat reported to *S.oleoides* was invasion of exotic species like *Prosopis juliflora*, *Tamarix aphylla* and *Eucalyptus sp.* Plants of *Prosopis juliflora* were reported to compete at many places in the state of Haryana with *Salvadora oleoides* for space and growth.

DISCUSSION

A plant species is affected by various biotic and abiotic factors of environment. Singh (2004) reported that loss of habitat by anthropogenic disturbance was an important factor for reduction in population of *Salvadora oleoides* and *Prosopis cineraria* in Indian Thar desert. Present survey reported that *Salvadora* was present as dominant species only in some groves situated in central and south west districts of Haryana. Groves were present in village community land in all district. Bhandari (1978) described the distribution of *Salvadora oleoides* in Haryana especially in arid tracts. However, presently *Salvadora oleoides* in Haryana is characterized by restricted distribution. *Salvadora oleoides* is reducing very fast in arid regions as reported by Khan (1997). Yadav et al. (2010) predicted that sacred groves play a pivotal role in conservation and protection of some plant species of religious belief as well as medicinal value e.g. *Salvadora oleoides* and *capparis decidua*. Ahmad (2007) during collection of ethno –medicinal data also found that *Salvadora oleoides* was vulnerable in Lahore-Islamabad motorway in Pakistan. This plant was critically endangered along the districts of Yamuna corridor in the state of Haryana. Hence present investigation reveals that *Salvadora oleoides* needs the immediate strategies to propagate and conserve this species.

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