

RESEARCH ARTICLE

A Biological Report on *Senna uniflora* (Mill.) H. S. Irwin & Barneby from Rupnagar, Punjab, India

Bhavna Kabila^{1*}, Malkiat C. Sidhu¹, Amrik S. Ahluwalia²

Abstract

Senna uniflora (Mill.) H. S. Irwin & Barneby is a member of family Fabaceae and subfamily Caesalpinioideae. It is an invasive species to the Indian flora. It mostly grows in waste lands and along the roadsides. High plant density of this species has been reported from various parts of India, particularly in Uttar Pradesh, Madhya Pradesh, Rajasthan and Maharastra. *Senna uniflora* has also been recorded from the state of Punjab previously but it has not been studied for its biological details. Keeping this in view, present study has been planned on the biology and morphological analysis of *S. uniflora*, collected from Rupnagar, Punjab.

Keywords: Leaves, Morphology, Invasive, Punjab, Pods, Weeds, Flowers, Seeds.

Introduction

The floristic study of any area is important for scientific, cultural, economic, forestry, ecological and agricultural aspects. It is also useful to understand the loss or invasion of species to the area under investigation. Floristic explorations and taxonomic keys can provide useful information about the nomenclature, distribution, ecology, utility of various plant species and their ecosystem. Some of the species can displace or replace native plants species and be introduced into new areas.

Senna uniflora (Mill.) H. S. Irwin & Barneby (Syn. *Cassia uniflora*) is a member of the family Fabaceae and subfamily Caesalpinioideae. The genus *Senna* is comprised of around 260 species distributed throughout the world (mostly from warm and temperate regions) and 43 species in India (Singh 2001, Singh *et al.* 2013). Most of the species found

growing in unused land along the roadsides. *Senna uniflora* was introduced to India from South America and now growing as a weed in different parts of the country (Singh 1979, Raghavan 1980). No doubt that this species has been recorded by different researchers from India but has not been worked out for its morphological characteristics. The present study was undertaken for the biological study of *Senna uniflora*.

Materials and Methods

Study Area

Punjab is situated in the northern part of the country and has a geographical area of 5.04 million hectares, situated between the latitude of 29° 32' to 32° 33' N and longitude of 73° 52' to 76° 56' E. It has three physiographic regions namely, Mountainous Himalayas, Sub mountainous Himalayas and eastern and western alluvial plains. The state is also known to have genetic variability and consists of Northern dry deciduous mixed forests, dry deciduous scrub forests, Shivalik chir pine forests and dry deciduous bamboo forests. The present work has been carried out in district Rupnagar, which is a part of the Malwa region of the state (Figure 1).

Collection and Morphology

Plant material was collected from the natural habitat, village Panjoli near Santokgarh, Rupnagar, Punjab, growing along the roadside and wasteland. Different morphological characters related to the stem, leaves, flowers fruits *etc.* have been studied.

The collected specimens were identified using the available literature, floras and manuals (Bamber 1916,

¹Department of Botany, Panjab University, Chandigarh-160014, India.

²Eternal University, Baru Sahib, Himachal Pradesh-173101, India.

***Corresponding Author:** Bhavna Kabila, Department of Botany, Panjab University, Chandigarh-160014, India, E-Mail: bhavnakabila273@gmail.com

How to cite this article: Kabila B, Sidhu MC and Ahluwalia AS (2023). A Biological Report on *Senna uniflora* (Mill.) H. S. Irwin and Barneby from Rupnagar, Punjab, India. *J. Indian bot. Soc.*, 103 (4): 298-301. Doi: 10.61289/jibs2023.25.01.1114

Source of support: DST, New Delhi.

Conflict of interest: None.

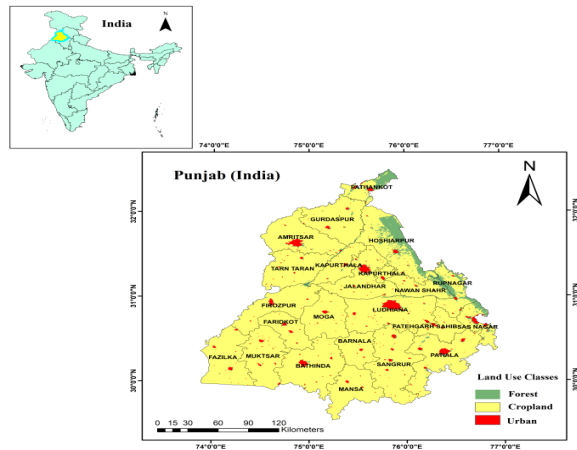


Figure 1: Map of the Study Area

Nair 1978, Singh 2001, E-flora of India 2007, The Plant list 2013, Flowers of India, Vattakaven *et al.* 2016, Sharma 2021). Different online flora, herbaria and the herbarium, Department of Botany, Panjab University, Chandigarh have also been consulted for the identification of species under consideration. The voucher specimen has been deposited in the herbarium Panjab University, Chandigarh (PAN 22180).

Results and Discussion

It is a rare invasive weed species growing along the roadsides or on wastelands. The species is an annual erect herb or undershrub, which can attain height upto 120 cm. The mature stems are hard, green to brown in color and glabrous. The young branches possess dense hairs and pubescent. Pinnately compound leaves have long rachis including the petiole. Stipules are linear and lanceolate, leaflets are usually four (sometimes 3-5), hairy on both sides. Yellow colored glands are present between all pairs of leaflets except the terminal one. Flowers are small, yellow and occur in axillary racemes, long peduncle, sepals are 5 oblong-ovate, outer side is hairy and pubescent in the inner side, petals are 5 yellow, obovate and prominently veined. Stamens are 10 (3 staminodes and 7 fertile), out of 10 stamens, 3 are with large subequal anthers, rest of the anthers are round at top, style is hairy. Pods are long linear, bearing short stalk, transversely compressed between the seeds and little hairy young pods are green and turns brown at maturity. Seeds are 5-10, rectangular or rhomboidal, presence of the clump of stellate hairs, dark brown dull and glabrous. The flowering period extends from August to October.

Rao and Sagar, (2013) recorded *Senna uniflora* as new additions to Indian floristics. However, the available literature suggests that it has earlier been reported by Singh, 1979 (*Cassia sericea*) and Raghavan, 1980 (*Cassia uniflora* Mill.) as a new records. It has been reported from Dhar and Jhabua districts of Madhya Pradesh (Samvartsar, 1996) and Andhra Pradesh (Reddy *et al.* 2000). It has been catalogued as an alien invasive flora (Reddy, 2008) and also reported from

Maharashtra (Kamble *et al.* 2013). Meena and Yadav, (2009) and Shukla *et al.* (2012) reported the species from this Rajasthan and Uttar Pradesh, respectively.

Senna uniflora has been enlisted as invasive alien species in Punjab (Punjab ENVIS Newsletter, 2013). Whereas it has not been mentioned in other floristic studies of Punjab like Bamber, (1916); Nair, (1978); Meenakshi and Sharma, (1985); Sharma, (1990); Sidhu, (1991) and Sharma, (2021). The present investigation has provided a detailed account of the morphological features of *Senna uniflora*. This description will be useful in the establishment of identity of this species and to differentiate it from other species of this genus. *Senna uniflora* is similar in morphology to *Senna tora* except for certain characters (Table 1, Figures. 2: 1a-e; 2a-e and 3).

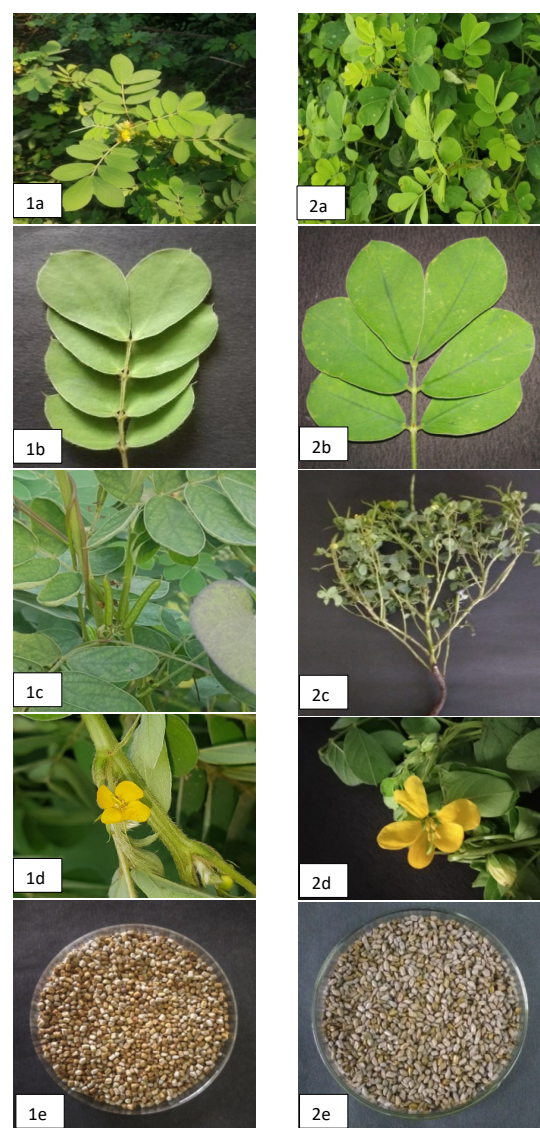


Figure 2: Whole plant (1a), Leaves (1b), pods (1c), flower (1d), mature seeds (1e) of *Senna uniflora* and Whole plant (2a), Leaves (2b), pods (2c), flower (2d), mature seeds (2e) of *Senna tora*

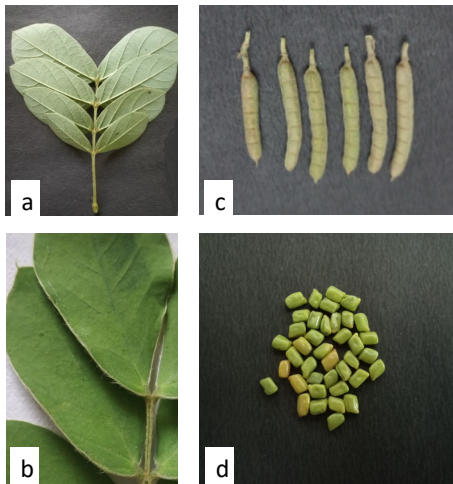


Figure 3: Abaxial surface of the leaf (a), Leaflets showing hairs (b), Pods (c), and fresh seeds (d) of *Senna uniflora*

Table 1: Distinguishing features of *Senna uniflora* and *Senna tora*

<i>Senna uniflora</i>	<i>Senna tora</i>
Leaflets are in four pairs or more	Leaflets are in three pairs
Glands are present in all pairs of leaflets except the terminal	One to two glands are present at the lowest pairs of leaflets
Stem and leaflets are hairy from both sides	Stem and leaflets are glabrous
Sepals are hairy, pods are sub compressed small (straight) and hairy	Sepals are glabrous, round at apex (anthers), pods are long (sickle-shaped)
Petals are obovate	One petal is bilobed
Seeds are dark brown, 5-10 per pod	Seeds are dull brown and 20-40 per pod

Conclusion

Senna uniflora an invasive alien species has been reported from Rupnagar, Punjab India. The morphological analysis has revealed its similarity with *Senna tora* but certain features like four leaflets, glands between all pairs of leaflets except the uppermost pair and presence of hairs on leaves and stem are unique for *S. uniflora*. It is different from other species of genus *Senna*. It may be because of its morphological similarity with *Senna tora* that *Senna uniflora* has not been much studied from the state of Punjab. It might have been the reason that the species have been overlooked and could not be listed by many researchers. "The recorded species is a new biological report of *Senna uniflora* from Rupnagar, Punjab".

Acknowledgements

Authors are thankful to the Chairperson, Department of Botany, Panjab University for providing necessary facilities and to the Department of Science and Technology, Government of India, New Delhi for financial assistance in the form of INSPIRE Fellowship to First author.

References

- Bamber C J (1916). *Plants of the Punjab. A descriptive Key of the flora of the Punjab, North-West Frontier Province and Kashmir*. Government Printing Press, Lahore. 1-652.
- Efloraofindia (2007). Database of Indian Plants - developed by the members of Efloraofindia Google group. Accessed at <https://sites.google.com/site/efloraofindia/>
- Fawcett W and Rendle A B (1920). Leguminosae. *Flora of Jamaica. W. Fawcett & AB Rendle (eds.)*, 4 106.
- Flowers of India. Retrieved August 23, (2016)., from <https://www.flowersofindia.net/>
- Irwin H S and Barneby R C (1982). "The American Cassiinae - A Synoptical Revision of Leguminosae tribe Cassieae subtribe Cassiinae in the New World". *Memoirs of the New York Botanical Garden* 35 1-918.
- Kamble R B, Sandeep H and Alka C (2013). New additions to the Flora of Nagpur District, Maharashtra. *Journal on New Biological Reports* 2(1) 9-13.
- Mate M, Kulkarni A S, Mehta P P and Dhamane S P (2013). Evaluation of anthelmintic activity of *Cassia tora* L. leaves against *Pheretima posthuma*. *Research Journal of Pharmacy and Technology* 6(10) 1152-1153.
- Meena K L and Yadav B L (2009). *Senna uniflora* (Mill.) Irwin & Barneby (Caesalpinaceae) A new record for Rajasthan. *Natural Product Radiance* 8(5) 525-527.
- Meenakshi and Sharma M (1985). *Flora of Ropar district*, Dev Publishers, Patiala, India. Pp-1-267.
- Nair N C (1978). *Flora of the Punjab Plains*. Botanical Survey of India, Indian Botanical Garden, Hawrah. Pp-1-326.
- Pradeep S V, Balan A P and Prasad V P (2008). *Senna uniflora* (Mill.) Irwin & Barneby (Fabaceae-Caesalpinaceae) - A New Record to Kerala. *Indian Journal of Forestry* 31(3) 435-436.
- Punjab ENVIS Newsletter (2013). *Invasive alien plant species in Punjab*. Punjab State Council for Science and Technology 11(4) 1-20.
- Raghavan R S (1980). *Cassia uniflora* Mill. (Caesalpiniaceae)-A new record for India. *Nelumbo-The Bulletin of the Botanical Survey of India* 22(1-4) 225.
- Rao R R and Sagar K (2013). *Cassia uniflora* Mill. (Caesalpiniaceae)-A new threat to Indian flora. *Journal of Economic and Taxonomic Botany* 37(1) 62-65.
- Reddy C S (2008). Catalogue of invasive alien flora of India. *Life Science Journal* 5(2) 84-89.
- Reddy C S, Bhanja M R and Raju V S (2000). *Cassia uniflora* Miller: A new record for Andhra Pradesh, India. *Indian Journal of Forestry* 23(3) 324-325.
- Samvartsar S (1996). *The flora of western tribal Madhya Pradesh*. Scientific Publishers, Jodhpur.
- Sharma M (1990). *Punjab Plants-Check List*. Bishen Singh Mahendra Pal Singh Publications, Dehra Dun, India. 1-115.
- Sharma M (2021). *Vascular flora of Punjab and Chandigarh* (Vol I, II and III). Bishen Singh Mahendra Pal Singh, Dehradun, India. 524-545.
- Shukla B K, Tiwari A P and Shukla A N (2012). *Senna uniflora* (Mill.) HS Irwin & Barneby (Caesalpinaceae) and *Sida tiagii* Bhandari (Malvaceae): new records for the flora of Uttar Pradesh. *Journal of Non-Timber Forest Products* 19(2) 157-158.
- Sidhu M K (1991). *Biology of Punjab Weeds*. Anova Publications, Mohali. Pp-1-184.

- Singh N P (1979). *Cassia sericea* Sw - A new record for India. *Bulletin of the Botanical Survey of India* **21** 203-205.
- Singh S, Singh K S and Yadav A (2013). A review on *Cassia* species pharmacological, traditional and medicinal aspects in various countries. *American Journal of Phytomedicine and Clinical Therapeutics* **1(3)** 291-312.
- Singh V (2001). *Monograph of Indian Subtribe Cassiinae (Caesalpinaceae)*, Scientific Publishers, Jodhpur, India. Pp-228.
- The Plant List* (2013). Version 1.1. Published on the Internet; <http://www.theplantlist.org/> (accessed 1st January)
- Vattakaven T, George R M, Balasubramanian D, Réjou-Méchain M, Muthusankar G, Ramesh B R and Prabhakar R (2016). India Biodiversity Portal: An integrated, interactive and participatory biodiversity informatics platform. *Biodiversity Data Journal* **(4)**.