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Exploration, collection and conservation of Gymnema sylvestre germplasm from different parts of India

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Abstract

Gymnema sylvestre is belongs to the family Apocynaceae. It is a high value medicinal plant which is used in Ayurvedic medicine due to its potential source of gymnemagenin. Gymnemagenin is the main active principle found in its leaves. Gymnema sylvestre is used to treat the diabetes since ancient times. The present study intensive explorations and collection of Gymnema sylvestre germplasm has been carried out from different parts of India to identify the high herbage yield coupled with high gymnemagenin type for sustainable production. The diverse areas are explored in the forest, tribal hilly areas and targeted diverse germplasm has been collected. During exploration, two types of variants were identified as narrow leaf type and broad leaf type. Two types of fruits have been observed in Gymnema viz., short length of fruit and longer fruits. Altogether five explorations were carried out and a total of 78 germplasm of Gymnema sylvestre has been collected from different areas of Madhya Pradesh, Karnataka and Telangana. These genetic resources of Gymnema sylvestre has been maintained in the field gene bank at ICAR-DMAPR, Anand, Gujarat and further need to be characterize the germplasm for growth, yield and quality traits for the selection of elite germplasm for specific trait of interest.

Keywords: Gymnema sylvestre, germplasm, Western Ghats, genetic diversity, diabetes

Introduction

India is a treasure house of medicinal and aromatic plants. India is one of the world's top 12 mega diversity countries with 10 bio-geographic regions. India is having two among the world's eight biodiversity hotspots. World Health Organization (WHO) stated that 21,000 plant species are used for medicinal purposes around the world. About 70 per cent of medicinal plants in the country are spread across the tropical forest of Western Ghats. India is rich in biodiversity due to varied climatic and soils conditions and is suitable to grow various crops by the need of the people and industry. The use of herbal medicine to cure various ailments of human and animal is age old practices in the rural areas. According to WHO about 80% of the world population in the developing countries are rely on traditional medicines for their primary health care needs (Ghosh, 2003) [2]. About 90 per cent of the Indian herbal industries are collecting the raw materials from the wild source. In the forest, 70 per cent of the collection involves indiscriminate over harvesting because of the parts like roots, bark, wood, stem and whole plant in case of herbs irrespective of the stage and maturity of the plant and without following the guidelines of good collection practices leads to the loss of biodiversity and many medicinal plants have rare, threatened, endangered and vulnerable in nature. The red data of book lists 427 Indian medicinal plants are endangered species of which 28 are considered extinct, 124 endangered, 81 rare and 34 insufficiently known (Lakshman, 2016) [3]. The demand for herbal industries is increasing day by day due to the awareness of green therapy from medicinal and aromatic plants and is efficacy in the treatment and side effects of using modern medicine. In India, about 8000 species of medicinal plants are used in the preparation of traditional medicines (Sukumaran and Rajan, 2010) [10]. Among which Gymnema sylvestre is one of important botanical widely used in the traditional system of medicine. Its leaves and roots are the economic parts. Gymnemagenin is the bioactive principle extracted from its leaves and used in the treatment of diabetes since 2000 B. C. (Wild et al. 2004) [11]. It grows in tropical forest of central and southern part of India up to 600m (Padmapriya et al. 2010) [6]. In India, the products of herbal medicine containing Gymnema alone in combination with other anidiabetic herbal medicines are sold in the market. Gymnema is mainly exported to Unites States, Japan, Belgium, Singapore, Taiwan, and Israel in the form of Gymnema leaf powder, leaf extract and as an organic herb. Due to medicinal importance and great demand by the herbal industries, this plant is vulnerable in nature

(Rapini *et al.* 2003) ^[9]. Hence the collection and conservation of *Gymnema sylvestre* from wild areas of different parts of country is our prime need for conservation and multiplication of species and bring to under commercial cultivation. Exploration and collection of *Gymnema sylvestre* genotypes from wild is prerequisite for development of population for selection of genotype with specific trait of interest. Exploration trips could be useful to identify the elite genotype which could be a great use in future breeding programme (Nair and Keshavachandran, 2006) ^[5]. Hence considering the importance of medicinal value of this crop, survey and exploration has been taken place in Karnataka, Madhya Pradesh and Telangana to assess genetic diversity of *Gymnema sylvestre* from different eco-geological region of India.

Materials and methods

The intensive survey and exploration trips were carried out during the year 2018-19 to collect Gymnema sylvestre germplasm from wild sources to assess the genetic diversity of genotypes for high biomass coupled with high gymnemagenin. A team of scientists, senior research fellow and technical assistant were explored different parts of India for collection of Gymnema sylvestre germplasm. First exploration trip was carried out in collaboration with National Bureau of Plant Genetic Resources (NBPGR), Regional Station, Akola as national programme of germplasm collection formulated by NBPGR, New Delhi. The survey and exploration was taken up after had a discussion with traditional healers in the tribal villages, forest range officers, agricultural officers, KVK scientists and local aged persons. The germplasm have been collected from different locations such as farmer's field, tribal hilly areas, traditional healers, forests and wastelands, but among the collections large numbers of genotypes were collected from forest area to capture the genetic diversity. For collection of Gymnema germplasm standard practice and procedure developed by NBPGR was followed (Pareek et al., 2000) [8]. Passport data of each genotype of Gymnema sylvestre has been recorded at the time of collection. Latitude, longitude and altitude of each collection of Gymnema genotypes were recorded using Global positioning system (GPS Montana 680 Garmin Taiwan). The team explored in the villages, famers fields, forest, wastelands, hillocks with the help of local people and forest range officers from different areas such as Madhya Pradesh (Betul, Chhindwara, Seoni, Balaghat, Jabalpur, Damoh and Sagar), Karnataka (Belagavi, Gadag, Uttara Kannada, Udupi, Shivamogga, Tumakuru and Bengaluru) and Telangana (Hyderabad) and collected a total of 78 genotypes and maintained in the field gene bank at ICAR-DMAPR, Anand, Gujarat for further characterization.

Results and discussions

The intensive exploration trips were made at Madhya Pradesh, Karnataka and Telangana and a total of 78 germplasm of *Gymnema sylvestre* has been collected and germplasm details are presented in the table 1 and distribution was depicted in plate 5. The variability for leaf and fruit (follicle) character was observed among collected genotypes. Similar results have been reported by Dhanani *et al.* (2015)^[1] significant variation of leaf characters in natural population of *Gymnema sylvestre*. The leaf variability was corroborated with earlier studies reported by Nair and Keshavachandran (2006) ^[5] where the genotypes were collected from Kerala and Pandey and Yadav (2010) ^[7] also reported that the leaf variability of Gymnema samples collected from Madhya Pradesh. In the first exploration trip at Betul, Chhindwara, Seoni and Balaghat districts of Madhya

Pradesh a total of 9 genotypes were collected. In the village Belamandi the traditional healer is maintained the few plants of Gymnema in the house and also in the field to the preparation of traditional medicines in the name of sugar plant to treat the diabetic patients. Pandervani forest area of Seoni district and Patalkot forest in Tamia of Chhindwara district are the two hotspot areas where wild grown Gymnema in the top of tendu plants was observed. In this forest woody vines of Gymnema are climbed over 'tendu' to the height of 10-15m. Patalkot in Chhindwara district is the hotspot for various medicinal and aromatic plants at Madhya Pradesh. In Chhindwara, many herbal industries and traditional healers are collecting the raw material from Patalkot. Hence *Gymnema sylvestre* is going to be extinct in the wild areas due to over harvesting and grazing by animals.

Second exploration in the area of Belgavi, Gadag, Uttar Kannada, Udupi, Shivamogga has been surveyed during January 2019. Khanapur in Western Ghats of Karnataka is the hotspot for wild grown Gymnema at Belagavi. In Kitturu (Belagavi district) the genotypes were shown vigorous growth habit which is having broad leaf and high biomass. The genotypes collected from Uttara Kannada having both narrow and broad leaf types. In Sirsi of Uttara Kannada district Gymnema is widely distributed in the tribal hill areas, farmer's fields in the arecanut garden and forest areas. In the plain area of Udupi Gymnema is sparsely distributed. Incase of Shivamogga it is available in the forest. During the survey and exploration in the Western Ghats of Karnataka a total of 43 genotypes of Gymnema have been collected. Similarly survey and collection of various medicinal and aromatic plants was done in Southern Western Ghats of Karnataka. (Manilal, 1988)

Third exploration was made in the area of Jabalpur, Damoh and Sagar districts of Madhya Pradesh. In this survey a total of 11 genotypes have been collected. The village Imaliya in the Damoh district is the hotspot for Gymnmea sylvestre where it is grown naturally. In this Imaliya hillock the people are visiting from different parts of Madhya Pradesh to worshipping in the 'Hanuman temple' at this hillock and beside this temple they are collecting the Gymnema herb in the same hillock (Imaliya) to quickly cure diabetes because of belief in this hillock where Hanuman temple was located in the name of Mandapa. Dhamoni is another hotspot for naturally grown Gymnema sylvestre as the same concept of the nearby hanuman temple at this village. During rainy season over harvesting of Gymnema sylvestre leaves by the village people of Dhamoni and sell it to the middleman who is associated with herbal company. The people in the village of Dhamoni are using Gymnema leaves as traditional medicine to treat the diabetes and also eye problems with the local name of "Phoolkat".

Survey and collection of Gymnema from Tumakuru district of Karnataka has been performed during March 2019. In this survey the main focus was to collect wild grown Gymnema genotypes form Siddarabetta. Siddarabetta forest (Religious Hillock) is the hotspot for various medicinal and aromatic plants. In this area 'Namada chilume' and Siddrarabetta forest a total of 8 genotypes have been collected, whereas in Hesaraghatta and Bengaluru total 4 genotypes have been collected. In the last exploration at Hyderabad (Telangana) 3 genotypes has been collected from the wild source.

Conclusion

Genetic diversity is the basic information for any crop breeding programme. The collection of large number of diverse germplasm is a prerequisite for crop improvement. The herbal industries are collecting the raw materials of Gymnema from the wild and collectors are doing over-harvesting in forest or wild source leads to the species is vulnerable in nature. Hence collection of large number of genotypes is the prime need for conservation and multiplication to promote the cultivation of Gymnema for sustainable production and supply of the raw materials to meet the demand of herbal industry. Hence in this direction the present effort has been done and 78 germplasm of *Gymnema sylvestre* were collected from Karnataka, Madhya Pradesh and Telangana where this species is predominantly available. Considerable variability has been observed in the

collections of Gymnema for major characters. Further the collected germplasm need to be characterizing for growth, yield and quality traits could be highly beneficial for crop improvement of *Gymnema sylvestre*.

Acknowledgement

Authors are thankful to National Medicinal Plants Board, New Delhi for the financial support for collection of germplasm and also thanks to Dr. Harsha V. Hedge for his guidance while collecting the germplasm at Karnataka.



Plate 1: Collection of Gymnema sylvestre from Madhya Pradesh



Plate 2: Collection of Gymnema sylvestre from Western Ghats of India



Plate 3: Collection of Gymnema sylvestre from Western Ghats of India

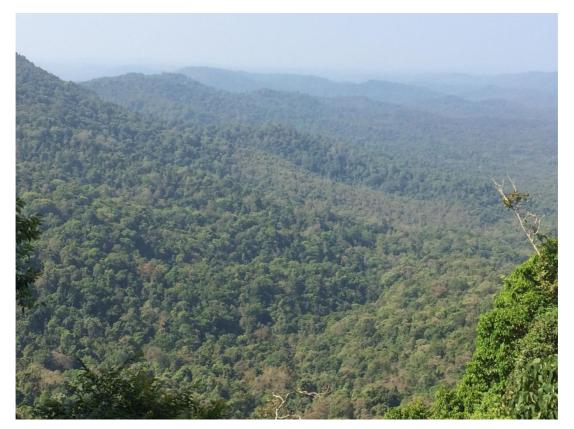


Plate 4: Over view of Western Ghats of Karnataka

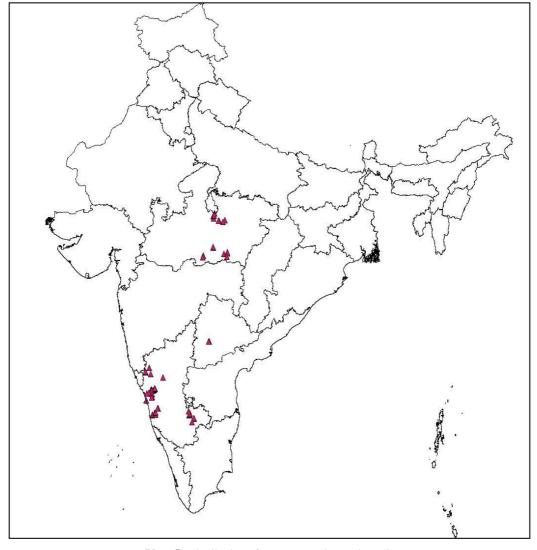


Plate 5: Distribution of Gymnmea sylvestre in India

Table 1: List of Gymnema sylvestre germplasm collected during explorations

1. Relamanth Multial Betul Multips Probable 2155.55 7804.21 779.	S. No.	Place of collection	Tehsil/Taluk	District	State	Latitude (°N)	Longitude (°E)	Altitude (m)
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Tumin forest, Patalikot								
Banulana Dehi Nunsers, Part 2	4.	Tamia forest, Patalkot	Tamia	Chhindwara			78°40.80	620
	5.	Hardua nursery, Range-Chourai, East Van Mandal	Chhindwara	Chhindwara	Madhya Pradesh	22°00.88	79°21.70	585
Secon		Bamahan Dehi Nursery, Part -2	Seoni		Madhya Pradesh	22°02.92	79°34.75	635
99. Rukhad forest, Near Pench National park Khanapura Belagari Karnantaka 1539.03 742.81.5 609 11.1 Infiniti Khanapura Belagari Karnantaka 1539.03 742.81.5 609 12.2 12.2 Hammanhatti Shalaborqal Belagari Karnantaka 1539.07 742.81.5 790.1 740.1					•			
11. Jambot								
Hausumanhatti			•	- C				
13. Kolawalli Kittur Belagavi Karnataka 1534.0 7447.15 730								
15. Kolavalli								
15								
16. Kolawalli Kittur Belagavi Karmataka 1534.09 7447.09 723 747.15 410 748				- C				
17. Kolawalli Kittur Belagavi Karnataka 152,18 7447,15 410 18. Kurtsikori Gadag Gadag Karnataka 152,186 753,260 663 19. Kalasapura Gadag Gadag Karnataka 152,186 753,260 663 20. Sadashivalii Sirsi Utra Karnada (UK) Karnataka 1479,97 745,116 557 21. Dasanapalde Sirsi UK Karnataka 1479,97 745,116 557 22. Dasanahaliigadde Sirsi UK Karnataka 1430,10 745,000 530 23. Dodduru Sirsi UK Karnataka 1440,10 745,000 530 24. Malagi Mundgod UK Karnataka 1442,23 745,73 648 25. Malagi Mundgod UK Karnataka 1442,23 745,73 648 26. Paladoddakere Mundgod UK Karnataka 1442,23 745,958 618 27. Paladoddakere Mundgod UK Karnataka 1447,39 750,210 600 28. Bommanili Sirsi UK Karnataka 1447,39 750,210 600 29. Bommanili Sirsi UK Karnataka 1440,10 7449,98 552 30. Sabasralinga road Sirsi UK Karnataka 1443,12 7448,63 473 31. Sahasralinga Sirsi UK Karnataka 1443,12 7448,63 473 32. Hulagola Sirsi UK Karnataka 1443,12 7448,64 466 33. Byrumbe Sirsi UK Karnataka 1440,04 7449,98 552 34. Kallali Farm Hones, Targoda Sirsi UK Karnataka 1443,12 7448,63 473 34. Kallali Farm Hones, Targoda Sirsi UK Karnataka 1443,12 7448,63 473 35. Tyagali Siddapur UK Karnataka 1440,04 7449,07 535 36. Tyagali Siddapur UK Karnataka 1470,03 7449,07 535 37. Tyagali Siddapur UK Karnataka 1470,03 7449,07 535 38. Kodhikopa Joga read Joga Shimoga Karnataka 1470,03 7449,08 532 39. Joga read Joga Shimoga Karnataka 1470,03 7449,08 532 40. Amunanalii Kumta UK Karnataka 1470,03 7449,08 539 38. Kodhikopa Joga Shimoga Karnataka 1470,03 7449,08 539 40. Amunanalii Kumta UK Karnataka 1470,03 7449,08 536 42. Mashini								
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500	66.	Siddarabetta road	Tumkur	Tumkur	Karnataka	13°21.34	77°10.93	890

67.	Siddarabetta road	Tumkur	Tumkur	Karnataka	13°21.35	77°10.91	892
68.	Siddarabetta road	Tumkur	Tumkur	Karnataka	13°22.15	77°11.64	860
69.	Irakasandra colony	Tumkur	Tumkur	Karnataka	13°26.13	77°14.18	808
70.	Siddarabetta	Koratagere	Tumkur	Karnataka	13°34.12	77°08.50	871
71.	Siddarabetta	Koratagere	Tumkur	Karnataka	13°33.93	77°08.39	892
72.	Hesaraghatta	Bengaluru	Bengaluru	Karnataka	13°09.45	77°28.59	869
73.	Byatha	Doddaballapur	Bengaluru	Karnataka	13°11.41	77°28.46	818
74.	Madhure	Doddaballapur	Bengaluru	Karnataka	13°11.50	77°27.92	872
75.	Thippakondanalli dam	Nelamangala	Bengaluru	Karnataka	12°59.21	77°20.79	787
76.	MANAGE Road, Rajendranagar	Hyderabad	Hyderabad	Telangana	17°18.72	78°24.87	529
77.	MANAGE Road, Rajendranagar	Hyderabad	Hyderabad	Telangana	17°18.78	78°24.88	538
78.	NAARM, Rajendranagar	Hyderabad	Hyderabad	Telangana	17°18.97	78°24.69	533

References

- 1. Dhanani T, Singh R, Waman A, Patel P, Manivel P, Kumar S. Assessment of diversity amongst natural populations of *Gymnmea sylvestre* from India and development of validated HPLC protocol for identification and quantification of gymnemagenin. Industrial Crops and Products. 2015; 77:901-909.
- Ghosh A. Herbal folk remedies of Bankura and Medinipur districts, West Bengal (India) India Journal of Traditional Knowledge. 2003; 2:393-396.
- 3. Lakshman CD. Biodiversity and conservation of medicinal and aromatic plants Advances in Plants and Agriculture Research. 2016; 5(4):561-566.
- 4. Manilal KS. Flora of Silent valley, tropical rain forest of India. Department of science and technology, Government of India, New Delhi, 1988, 398.
- Nair S, Kehavachandran R. Genetic variability of chakkarakolli (*Gymnema sylvestre* R. Br.) In Kerala assessed using morphological and biochemical markers J. Trop Agric. 2006; 44:64-67.
- 6. Padmapriya S, Kumanan K, Rajamani K. Studies on effect of organic amendments and bioinoculants on morphology: yield and quality of *Gymnmea sylvestre* R. Br. African Journal of Agricultural Research. 2010; 5:1655-1661.
- 7. Pandey AK, Yadav S. Variation in gymnemic acid content and non-destructive harvesting of *Gymnema sylvestre* (Gudmar). Pharmacog. Res. 2010; 2:309-312.
- 8. Pareek SK, Bisht IS, Bhatt KC, Kumar A, Koppar MN, Gupta PN *et al.* Manual on Exploration and Collection of Plant Genetic Resources and Related Indigenous Knowledge. NBPGR, New Delhi. 2000, 63.
- Rapini A, Chase MV, Goyder DJ, Griffiths J. Asclepiadeae Classification: evaluating the Phylogenetic relationships of New World Asclepiadoidear (Apocynaceae). 2003
- 10. Sukuman S, Rajan ADS. Medicinal plants of sacred groves in Kanyakumari district, Southern Western Ghats. Indian Journal of Traditional Knowledge. 2010; 9(2):294-299.
- 11. Wild S, Roglic G, Green A, Sicree R, King H. Global prevalence of diabeties. Diabetes Care. 2004; 27(5):1047-1053.