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Cover: Whale Shark *Rhincodon typus* and Reef - made with poster colours. © P. Kritika.



INTRODUCTION

Wild plants are natural gene banks containing exceptionally rich hereditary information, as well as humankind's important resources and the groundwork of present day garden plants (Dulloo & Maxted 2019; Cong & Han 2022). The constructive developments in the utilization of wild plant assets not just enhance the beauty of metropolitan greening and beautification yet additionally increase the urban biodiversity index and diminish the serious misfortunes brought about by the introduction of ornamental plants that are not appropriate for the local environment (Gong et al. 2019). Wild plants also constitute an integral part of urban green packages as part of nature based solutions for climate change adaptation mitigation strategies in rapidly growing cities (Nassary et al. 2022).

Plant species which are primarily utilized for aesthetic and decorative purposes are popularly known as ornamental plants (OPs). All plant species suitable for indoor or outdoor beautification and decorations are categorized as ornamental plants (Lecomte et al. 2016; Chowdhuri & Deka 2019). Shape & size of the plant, color, texture, line & form, lush foliage, and showy flowers are considered as important ornamental attributes of plant species (Vabrit 2002; Zucchi et al. 2020; Khaleghi & Khadivi 2022). Transportation durability, resistance to extreme of cold & hot conditions, quality & uniqueness, maintenance cost, trend in market, and other specific requirements such as medicinal, cultural, spiritual, or ritual are some of the other attributes of OPs. A large variety of herbs, shrubs, avenue plants, hedges, ground covers, cacti, succulents, bonsai, palms, bulbs, cones, hanging plants, epiphytes, decorative foliage, showy floral plants, sweet scented, and grasses fall under the category of OPs and are grown by individuals (Gajendrudu 2014).

OPs intensify and glorify our surroundings, they add positive attitude to life, intensify the feeling of happiness, and enhance economic importance of the estate (Harris 1992; Rocha et al. 2021). Owing to the beauty they bring, OPs spare an element of satisfaction, relaxation, and delight to human beings. OPs additionally play a significant role in metropolitan and rural environmental planning, fallow land improvement, afforestation, and finishing of open air & indoor spaces. Interior plants also improve worker productivity and reduce stress in a windowless environment (Lohr et al. 1996; Yeo 2021; Berger et al. 2022).

It is accepted worldwide that all plants used in ornamental and amenity horticulture and the diversity

of cultivars derived through selection and breeding, originally came from wild plants or their relatives (Heywood 2001). The wild plants have owned a reviving knowledge on the link between wild nature and human wellbeing (Friedman et al. 2022). The majority of the decorative plants are obtained from wild resources. Missionaries, globetrotter, rambler, emissary, sea captains, and tourists have a significant contribution in introducing and naturalizing a large number of OPs from different continents. The transformation of these introductions of wild growing species into potential commercial cultivars was largely undertaken by highly skilled, observant, and entrepreneurial nurserymen, many of whom were very talented plant men who initiated plant improvement programmes themselves by selection and breeding. Wild ornamental plants (WOPs) are more resilient to water scarcity, extremes of temperature, and require less attention & care. WOPs are also well adapted to local soil conditions and their cultivation requires very less pesticides & fertilizers. Moreover, WOPs also provide shelter and food to native insects, birds, and other life forms. WOPs further influence the phenology of flowering plants by influencing health and number of pollinators (Stout & Dicks 2022).

There is a rich plethora of wild plants which are often used for ornamental and aesthetic purposes. WOPs are having striking feature and are easily distinguishable on the land surfaces. Some WOPs show high variability in different ornamental attributes as compared to cultivated plants. Rao et al. (2006) identified and documented 61 potential wild ornamental species of Convolvulaceae from Eastern Ghats of Andhra Pradesh, India. Babu et al. (2017) explored and documented the 153 wild ornamental flowering plants species belonging to 112 genera and 48 families from Palakonda hills of Eastern Ghats in Andhra Pradesh, India. Haridasan & Rao (1985) conducted floristic exploration in Meghalaya they identified a number of ornamentally useful important wild species. All these researchers documented great ornamental potentialities of WOPs due to their attractive foliage and good-looking flowers. According to their findings, there are lot of opportunities for exploring the meaning of both indoor and outdoor gardening and landscape techniques.

The diversity of WOPs found in the Aravalli Hill Ranges in India are facing high rate of depletion primarily due to increase in the illegal mining, urbanization rate, industrialization, pollution, over-exploitation, and heavy infestation by alien plant species like *Prosopis juliflora* (Sw.) DC., *Verbesina encelioides* (Cav.) Benth. & Hook.f.

ex A. Gray, *Parthenium hysterophorus* L. and many other plant species (Sharma et al. 2013). Though many floristic studies have been conducted in this region but no concerted efforts have been made to explore and document the diversity of ornamental plants of this region. Therefore, it seems to be an urgent requirement to carry out methodical floristic identification and studies of ornamental plants of wild genera from this region to formulate appropriate conservation and management strategies. Efforts have been made to explore the nativity of WOPs growing in different parts of the district. Hence, the present study was done to explore the types of ornamental plants from Aravalli Hill Ranges of Rewari district of Haryana.

MATERIALS AND METHODS

Study site description

The Rewari district is situated in the southern part of Haryana 80 km from New Delhi. It covers the geographical area of approximately 1,559 km², and lies between 27°86'–28°28' N & 76°15'–76°51' E. It is bounded by Jhajjar district in the north, Mahendergarh district in the west, Gurugram district in the east, Mewat district in north-east directions. Alwar district of Rajasthan touches Rewari in the south-east direction (Figure 1) (<https://rewari.gov.in/about-district/location/>). The temperature may be more than 45° C in summer months. The Rewari district is a part of the Indian arid zone having low rainfall of 569 mm annually. The region also receives low annual rainfall restricted to a few months of monsoon.

Collection and preservation of Plant Specimens

An intensive field survey was conducted from July 2016–September 2021 in different parts of the Rewari district. List of places visited for survey and documentation of ornamental plants are mentioned in Table 1. Coloured photographs were taken in their natural habitat before the collection of plant specimen for identification purposes. Every effort was made to collect specimens in their reproductive stages, i.e., flowering or fruiting stages. Small herbs were collected as whole plants while, reproductive twigs were collected for large plants. Voucher specimen number was given to collected specimen alongside field labels. The collected specimens were treated with 10% formaldehyde solution, kept in air-tight polythene bags, and were pressed in between the blotting/filter papers in the field press. The collected specimens were brought to the laboratory for long-term storage. In the laboratory

the blotting papers of the specimens were replaced with new ones at a regular interval of 3–4 days until complete drying and were poisoned with 0.2% mercuric chloride.

Identification of plant specimens

The collected specimens were identified with the help of available standard floras published by various taxonomists (Hooker 1872–1897; Duthie 1903–1922; Maheshwari 1963). Photographs of the plants were taken in their natural habit and field notes were prepared for identification. Further, online literature and search engines were used for validating botanical names of the plants under study, viz., <http://www.theplantlist.org/>, <https://powo.science.kew.org/>, and <http://www.flowersofindia.net/>. The voucher specimens were deposited in the herbarium of Department of Botany, Maharshi Dayanand University, Rohtak (Haryana) India for future reference.

Determination of Nativity of Plants:

Knowing whether a plant species is native or introduced is less clear-cut than it might appear. For determination of nativity of plant species, methods of Webb (1985), Usher (2000), Pysek et al. (2004), Willis & Birks (2006), Bean (2007), Fertig (2011), Hughes & Convey (2012), & eflora of India (2022) have been consulted and for finalization of nativity the website <https://powo.science.kew.org/> was taken as final distribution.

Data Analysis

Common names, habit, important ornamental attributes, and potential uses by the community of identified WOPs are mentioned in Table 2. The data were analysed through MS Excel package 2007.

RESULTS

In the present study, 88 plants belonging to 40 families have been documented from different parts of Rewari district, Haryana (Table 1). Out of 88 plant species, 78 dicot plant species belonging to 36 families and eight monocot plant species belonging to two families, fern & gymnosperm, viz., *Actiniopteris radiata* (Sw.) Link and *Ephedra foliata* Boiss. ex C.A. Mey. are represented by single family each. A comparison of monocots and dicots in terms of families and species is shown in Figure 2.

Dominant Families

Among the documented families, Asteraceae and Poaceae are the most dominating (Figure 3). The



Figure 1. Map of study area.

remaining plants are fairly distributed in various families. In the present study, 22 families are represented by one species each. Out of these, 18 families are of dicots, one family from monocots, two families belonged to ferns, and one family belonged to gymnosperms. Some of the prominent WOPs plants from the region have been shown in Images 1,2(A–R). Families having single wild ornamental species in this region are Aizoaceae,

Aristolochiaceae, Asclepiadaceae, Bignoniaceae, Boraginaceae, Celastraceae, Commelinaceae, Cucurbitaceae, Ephedraceae, Meliaceae, Menispermaceae, Moringaceae, Nyctaginaceae, Padaliaceae, Plumbaginaceae, Portulacaceae, Pteridaceae, Rubiaceae, Sapindaceae, Tamaricaceae, Verbenaceae, and Vitaceae.

Table 1. List of places visited for survey and documentation of ornamental plants.

Community block	Places visited	Place	Community block	Places visited	Place
Bawal	Amit Vatika Nursery, Jai Singh Pura, Khera Bawal	Nursery	Rewari	Pushpanjali hospital	Hospital
	Baba Devnarayan mandir, Gujar Majri	Temple		Ramgarh	Village
	Bala Ji Mandir, Rajgarh	Temple		Saini Nursery, Kayasthwar Mohalla	Nursery
	CCS, HAU Regional Research center, Bawal	Research center		Sanatan park, Dharuhera	Public park
	Gujar majri	Village		Shanti devi college of law and Management, Saharanwas	College
	Harley Davidson motorcycles	Factory		Shiv Temple, Asiaki Gorawas	Temple
	Kanuka	Village		Shri Gangaram Nursery, Jainabad	Nursery
	Minda Furukawa electric Pvt. Ltd.	Factory		Shri Shyam Nursery, Dahina	Nursery
	Mohanpur	Village		Tagore Public School, Jadra	School
	Nechana	Village		Thakur Ji Mandir, Lilodh	Temple
	Ompal Garden Services, Bagthala, Banipur	Nursery		Vedanta hospitals	Hospital
	Rajgarh	Village	Nahar	Bhakli	Village
	Tankri	Village		DAV Girls College, Kosli	College
Rewari	Ahir college	College		Government College, Kosli	College
	Baba Bhairav Temple, Dehlawas	Temple		Gudiani	Village
	Baba Udhodas mandir, Saharanwas	Temple		Jhal	Village
	Bikaner	Village		Jhal Nahar forest, Nahar	Wildlife century
	BMG Mall	Shopping mall		Lilodh	Village
	Canal Valley Public School, Berli Kalan	School		Lukhi	Village
	Chillar	Village		Lula Ahir	Village
	District Court, Subash nagar	Judicial complex		Mata Mandir, Nahar	Temple
	Hanuman Mandir lake, Jadra Village	Temple		Shiv Mandir, Kosli	Temple
	Hanuman Temple, Kundal	Temple		Vandana Nursery, Bhakli, Kosli	Nursery
	Holy child public school, Madhu vihar	School		We for nature Nursery, Palhawas	Nursery
	I G University, Meerpur	University	Jatusana	Baldhan Khurd	Village
	Jain Public School	School		Bodia Kamalpur	Village
	Kakoria	Village		Jatusana	Village
	KLP college	College		Mastapur	Village
	Lavishka Plants Nursery, Lisana	Nursery		Musepur	Village
	M2K Country Park, Dharuhera	Public park		Rajawas	Village
	Madhu Sudan public school, Mahavir nagar	School	Khol	Baba Gopal Das mandir, Nandha	Temple
	Majra Sheoraj	Village		Baba Nimriwala Temple, Pali	Temple
	Muradpuri	Village		Khori	Village
	Nai Wali Bagachi and mandir	Temple		Kund	Village
	Naichana	Village		Manethi	Village
	Nursery Berli, Berli Kalan	Nursery		Nandha	Village
	Nursery Hut Shri Ganga Ram Nursery, Zainabad	Nursery		Near Hanuman Mandir, Manethi	Temple
	Old Saini Nursery, Kayasthwar Mohalla	Nursery		Pali	Village
	Old Shiv Mandir, Bodia Kamalpur	Temple		Pali Herbal park, Pali	Public park
	Plants Nursery, Dharuhera	Nursery		Pithrawas	Village
				Sonam Nursery, Pithrawas	Nursery

Habit-wise distribution

Herbaceous WOPs dominated in this region with 47 species followed by 16 species of trees, 13 species of climbers, and 10 species of shrubs (Figure 4).

Potential use of wild ornamental plants

In the present study a total 88 native wild ornamental plants have been reported from different parts of Aravalli Hill Ranges. Out of 88 plants, majority of them are used as garden plants which tops the list with 60 plants followed by 36 medicinal, 34 potted plants, 16 avenue tree, lawn cover, and hedge/fencing with 14 species each. Nearly a dozen native WOPs are used for edible and religious/ ceremonial purposes. Eight plants are planted as road dividers, four cultivated as cacti & succulent, and two as wild ornamentals grown in indoor

foliage (Figure 5). According to the present study, one plant species, i.e., *Ficus benghalensis* L. is being used for five different purposes—avenue plants, road side divider, hedge/fencing, religious/ceremonial, and medicinal. It was also reported that 16 plants are found to have four multiple uses, 25 plants have three multiple uses, 28 plants two uses, and 20 plants have single use (Figure 6).

Ethnomedicinal Uses

Some native wild ornamental plants are also used for primary health care purposes and treating their routine maladies in this region. For example, dried fruit powder of *Acacia nilotica* (Roxb.) Willd is helpful in curing diabetes and arthritis. Root extract of *Boerhavia diffusa* L. helps in curing jaundice. *Capparis decidua* (Forssk.) edgew fruits powder is helpful in indigestion and diabetes while root boiled with mustered oil applied externally for curing skin diseases. Fresh and dried fruits of *Ficus racemosa* L. cures diabetes. *Salvadora persica* L. fruits decoction mixed with sugar taken orally cures typhoid. Paste of fresh leaves of *Withania somnifera* (L.) dunal kills head louse when applied with buttermilk on scalp. Fresh leaves of *Chrysopogon zizanioides* (L.) roberty are refreshing and remove tiredness.

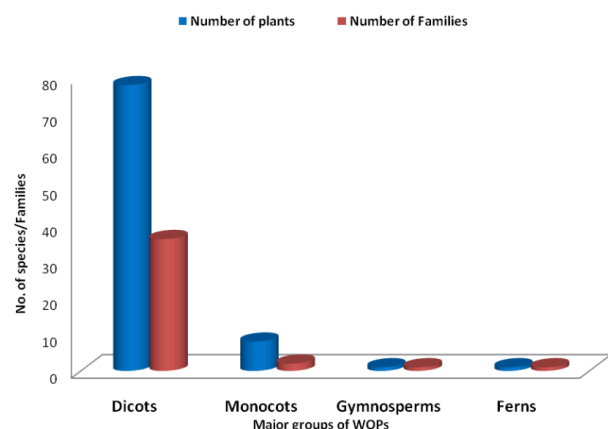


Figure 2. Composition of major groups of native wild ornamental plant in Aravalli Hill Range.

DISCUSSION

Nature has bestowed us with abundance of WOPs and they exhibit high degree of variety & variability in contrast to cultivated ornamental plants. Wild plants are having striking features in terms of floral, foliage, fragrant, and form (Shape, Size, Colour, and Life form)

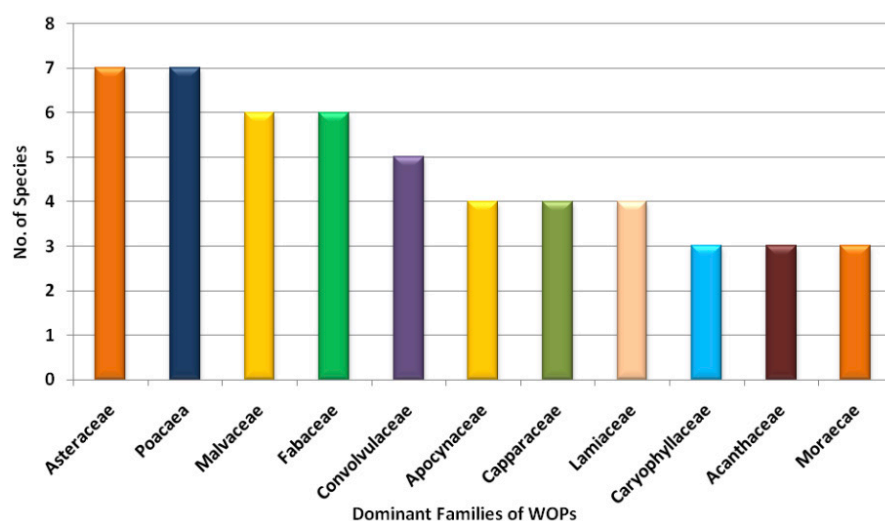


Figure 3. Dominant families having wild ornamental plant species in Rewari district.

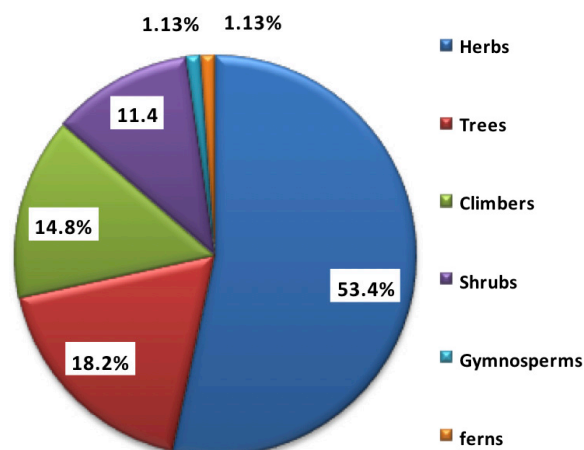


Figure 4. Habit-wise distribution of wild ornamental plants in Rewari District.

attributes. They are vital considering their positive incentives for individuals and society. The majority of current day OPs can be traced to their wild relatives, many of which still exist in their natural habitats. OPs assume a significant role in preparation and modification of urban and rural landscapes, fallow land development, afforestation, and managing of open air & indoor spaces. Wild vegetation of Aravalli Hill Range of Rewari district of Haryana is blessed with huge number of inquisitive, taxonomically fascinating, economically significant, and endemic plants (Yadav et al. 2021).

The Aravalli Hill Range is among the most distinct and primeval mountain chain. These hill ranges are economically and ecologically very crucial as they check the desert extending along Indo-Gangetic plains and pose influence over regional climate (Thapar 2015). Extreme environment and exceptional ecological niches provide perfect habitat for plants which is a unique distinctiveness of the range for survival. It has a wide range of climatic and geographical diversity, including tropical evergreen, subtropical, desert, temperate (Khanna 2011). Many plant species have been imported beyond their natural ranges as a result of increased globalization, and some of them have established and sustained persistent populations without human intervention (Seebens et al. 2022). These hill ranges are rich reservoir of wild medicinal and ornamental plants (Yadav & Bhandoria 2012). These hill ranges are a unique amphitheatre of biological diversity. These WOPs species contribute to available extensive genetic resources available to for varietal improvement and genetic modification. Bansal et al. (2022a) explored the Rewari region of Aravalli hill ranges and documented 42 wild exotic plants of ornamental potential. They

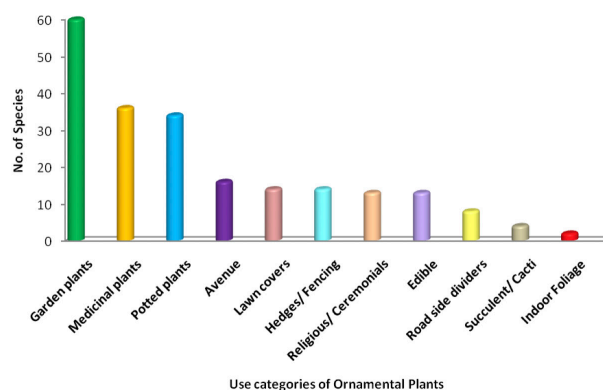


Figure 5. Potential use of ornamental plants.

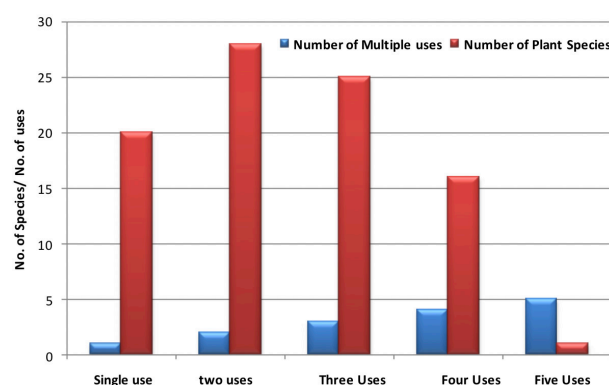


Figure 6. Wild ornamental plants with number of multiple uses in Rewari District.

recommended the utilization of wild exotic ornamental plants as an important strategy for restoration of degraded ecosystems. They also opined that wild ornamental plants may also help in increasing genetic diversity.

Total 88 native WOPs species belonging to 41 families have been reported from different parts of Aravalli Hill Ranges. These native WOPs have a great potential of use for different purposes. *Azadirachta indica* A.Juss., *Capparis decidua* (Forssk.) Edgew., *Crateva religiosa* G.Forst., *Salvadora oleoides* Decne., and *Salvadora persica* L. have delicious, nutritive edible fruits. *Tecomella undulata* (Sm.) Seem is a valuable native timber yielding tree growing wild in different parts of southern Haryana. The wood of this plant is used for making high quality furniture. *B. serrata* Roxb. ex Colebr., *Commiphora wightii* (Arn.) Bhandari, *Tinospora sinensis* (Lour.) Merr. and *Wrightia tinctoria* R.Br. are important medicinal plant. *Ephedra foliata* is the only naturally occurring gymnosperm species which have good medicinal properties. Globally efforts are taken

Table 2. List of native wild ornamental plants of district Rewari, Haryana.

	Name of species	Vernacular name	Family	Habit	Nativity	Ornamental attribute	Ornamental purpose
1	<i>Abrus precatorius</i> L. VSN; Bansal:308	Rati	Fabaceae/ Leguminosae	Climber	India	S, Fr	Garden plant
2	<i>Abutilon indicum</i> (L.) Sweet VSN; Bansal:135	Kanghi	Malvaceae	Shrub	India	Fl, Fr	Potted, Garden plant
3	<i>Acacia nilotica</i> (Roxb.) Willd. VSN; Bansal:228	Kikar	Fabaceae/ Leguminosae	Tree	India subcontinent, Africa, Saudi Arabia Zimbabwe,	Infl, Fr, Fol	Avenue, Medicinal, Religious/ Ceremonial, Edible
4	<i>Acalypha indica</i> L. VSN; Bansal:234	Kupi	Euphorbiaceae	Shrub	India	Fol, P.f.	Potted, Garden plant
5	<i>Achyranthes aspera</i> L. VSN; Bansal:295	Ultakanta, Punch kanta	Amaranthaceae	Herb	India	Infl, P.f.	Hedge/Fencing, Potted, Medicinal
6	<i>Argyrea cuneata</i> (Willd.) Ker Gawl. VSN; Bansal:465	Purple convolvulus	Convolvulaceae	Climber	India	Fl, Fol	Garden plant
7	<i>Aristolochia indica</i> L. VSN; Bansal:333	Duck Flower	Aristolochiaceae	Climber	India	Fl,Fol	Garden plant
8	<i>Azadirachta indica</i> A.Juss. VSN; Bansal:168	Neem, Margosa	Meliaceae	Tree	Assam to Indo-China	Fol, Fr	Avenue, Road divider, Medicinal, religious/ Ceremonial
9	<i>Barleria prionitis</i> L. VSN; Bansal:163	Pila bansa	Acanthaceae	Shrub	India, Bangladesh, Philippines, Sri Lanka	Fl	Hedge/fencing, Road divider
10	<i>Blumea lacera</i> (Burm.f.) DC. VSN; Bansal:197	Gandhi	Asteraceae	Herb	Tropical and Subtropical Asia, Australia	Infl, Head	Garden plant
11	<i>Boerhavia diffusa</i> L. VSN; Bansal:107	Punarnava, Santi	Nyctaginaceae	Herb	Tropical and Subtropical world	Fol, Fl	Garden plant, Medicinal, Edible
12	<i>Boswellia serrata</i> Roxb. ex Colebr. VSN; Bansal:177	Salai Guggul	Burseraceae	Tree	India	Fl,Fr,P.f.	Avenue, Medicinal
13	<i>Caesalpinia bonduc</i> (L.) Roxb. VSN; Bansal:202	Fever Nut	Fabaceae / Leguminosae	Climber	Tropics & Subtropics	Fr	Garden plant
14	<i>Capparis decidua</i> (Forssk.) Edgew VSN; Bansal:238	Kair. Teent	Capparaceae	Shrub	Mauritania to Andaman & Nicobar Islands India	Fl, P.f.	Hedge/ fencing, Road divider, Edible, Medicinal
15	<i>Capparis sepiaria</i> L. VSN; Bansal:239	Wild Caper, Hins	Capparaceae	Shrub	India, China, N. Australia	Fl,fol	Hedge
16	<i>Cenchrus ciliaris</i> L. VSN; Bansal:219	Buffalo grass	Poaceae	Herb	India, Greece, Africa, Arabian Peninsula	Infl	Garden plant
17	<i>Chrysopogon zizanioides</i> (L.) Roberty VSN; Bansal:267	Vativeria	Poaceae	Herb	Indo-China, Malesia	Infl, P.f.	Garden Plant, Potted, Medicinal
18	<i>Cissus quadrangularis</i> L. VSN; Bansal:406	Hadjod	Vitaceae	Shrub	India, Sri Lanka, W. & C Malaysia	St	Potted, Hedge/ Fencing, Garden plant, Medicinal
19	<i>Cleome gynandra</i> L. VSN; Bansal:103	Kukar Bhangra	Cleomaceae	Herb	Tropical and Sub tropical Asia, Australia, Africa,	Fl, Fol	Potted, Garden plant
20	<i>Cleome viscosa</i> L. VSN; Bansal:106	Hulhul	Cleomaceae	Herb	Tropical and Subtropical old world	Fl, Fr	Potted, Medicinal
21	<i>Clerodendrum phlomidis</i> L.f. VSN; Bansal:356	Arno	Lamiaceae	Shrub	India, Java	Fol, Fl	Hedge/Fencing
22	<i>Coccinia grandis</i> (L.) Voigt VSN; Bansal:286	Kundru	Cucurbitaceae	Climber	Tropical Africa, Tropical and subtropical Asia	Fl, Fol, Fr	Garden plant, Edible
23	<i>Commelina benghalensis</i> L. VSN; Bansal:105	Widow's tear	Commelinaceae	Herb	India, South Africa, Myanmar	Fl	Lawn cover, Garden plant
24	<i>Commiphora wightii</i> (Arn.) Bhandari VSN; Bansal:437	Gugal	Burseraceae	Tree	India, Oman, Pakistan	P.f., Fr	Hedge/Fencing, Medicinal, Garden plant
25	<i>Crateva religiosa</i> G.Forst. VSN; Bansal:231	Sacred Burna	Capparaceae	Tree	India, China, Myanmar, Thailand	Fl	Avenue, Road divider
26	<i>Crotalaria burhia</i> Benth. VSN; Bansal: 331	Kharsana	Fabaceae	Herb	Iran, India	Fl, P.f.	Hedge/fencing
27	<i>Cyanthillium cinereum</i> (L.) H.Rob. VSN; Bansal:288	Sahadevi	Asteraceae	Herb	India, China, Japan, Zimbabwe, Myanmar, Madagascar	Fl	Potted, Garden plant
28	<i>Cynodon dactylon</i> (L.) Pers. VSN; Bansal:410	Doob grass	Poaceae	Herb	Asia, Africa, Australia	Lf	Lawn cover, Religious/Ceremonial

	Name of species	Vernacular name	Family	Habit	Nativity	Ornamental attribute	Ornamental purpose
29	<i>Desmostachya bipinnata</i> (L.) Stapf VSN; Bansal:265	Kusha	Poaceae	Herb	Sahara, Tanzania, Indo-China	Infl	Garden plant, Religious/Ceremonial
30	<i>Dodonaea viscosa</i> (L.) Jacq. VSN; Bansal:263	Hopbush	Sapindaceae	Shrub	Asia, Africa, S. and C. America, Australia	Fl,Fr,Fol,P.f.	Hedge/ fencing, Garden plant, Road divider, Potted
31	<i>Echinops echinatus</i> Roxb. VSN; Bansal:302	Oont kanteli	Asteraceae	Herb	India, Myanmar	Infl	Garden plant, Hedge/fencing, Medicinal
32	<i>Elytraria acaulis</i> (L.f.) Lindau VSN; Bansal:446	Indian Scaly stem	Acanthaceae	Herb	India, Sri Lanka, Tropical & S. Africa	Fl, Infl	Lawn cover, Potted
33	<i>Ephedra foliata</i> Boiss. ex C.A. Mey. VSN; Bansal:409	Joint fir	Ephedraceae	Gynmosperm	India, Pakistan N. Africa	P.f., Fol	Potted, Medicinal
34	<i>Euphorbia granulata</i> Forssk. VSN; Bansal:316	Jangali Dudhi	Euphorbiaceae	Herb	India, Central Asia, N. & E. Africa,	Fol	Lawn cover, Succulent
35	<i>Evolvulus alsinoides</i> Kunyze VSN; Bansal:373	Dwarf morning Glory	Convolvulaceae	Herb	Tropics & Subtropics	Fl	Garden plant
36	<i>Ficus benghalensis</i> L. VSN; Bansal:198	Banyan Tree	Moraecae	Tree	India, South East Asia, Australia	P.f., Fol, Infl., Fr	Avenue, Medicinal, Potted, Religious/ Ceremonial, Edible
37	<i>Ficus racemosa</i> L. VSN; Bansal:125	Gular	Moraecae	Tree	India, Pakistan, N. Queensland	Fol, Fr	Avenue, Medicinal, Edible, Religious/ Ceremonial
38	<i>Ficus religiosa</i> L. VSN; Bansal:113	Peepal	Moraecae	Tree	India	Fol	Avenue, Potted Religious/Ceremonial
39	<i>Grewia tenax</i> (Forssk.) Fiori VSN; Bansal:269	Phalsa Cherry	Malvaceae	Shrub	India, S. Africa, Peninsula	Fl,Fr	Hedge/fencing
40	<i>Gymnosporia emarginata</i> (Willd.) Thwaites VSN; Bansal:250	Spike thorn	Celastraceae	Tree	India, Sri Lanka, Malaya	Fl, Fr, Fol	Avenue, Medicinal, Religious/Ceremonial
41	<i>Hemidesmus indicus</i> (L.) R.Br. ex Schult. VSN; Bansal:298	Annamool	Apocynaceae	Climber	India, Indo-China and Peninsula Malaysia.	Fol, Fl	Lawn cover, Garden plant, Medicinal, Indoor foliage
42	<i>Indigofera linifolia</i> (L.f.) Retz. VSN; Bansal:277	Indigo	Fabaceae/ Leguminosae	Herb	India, Europe, Mediterranean Region, Tropical S. Africa	Fol, Color	Garden plant
43	<i>Ipomoea cairica</i> (L.) Sweet VSN; Bansal:110	Morning Glory	Convolvulaceae	Climber	India, Arabian Peninsula Africa,	Fl, Fol	Garden plant
44	<i>Ipomoea pes-tigridis</i> L. VSN; Bansal:170	Bili keladoo	Convolvulaceae	Climber	India, Sri Lanka, Tropical East Africa	Fol, Fl, Frs	Garden plant, Medicinal, Edible
45	<i>Justicia adhatoda</i> L. VSN; Bansal:156	Basaka	Acanthaceae	Herb	Afghanistan to Indo-China	Fl, Fol	Potted, Hedge, Medicinal
46	<i>Launaea nudicaulis</i> (L.) Hook.f. VSN; Bansal:208	Jungligobhi	Asteraceae	Herb	India, Canary Islands, Peninsula, Mediterranean.	Infl	Garden plant
47	<i>Leptadenia pyrotechnica</i> (Forssk.) Decne. VSN; Bansal:282	Kheep	Apocynaceae	Herb	India, Sahara, Iran	Fl, P.f.	Hedge/fencing
48	<i>Leucas aspera</i> (Willd.) Link VSN; Bansal:279	Drona Pushpi	Lamiaceae	Herb	India, Mauritius, Tropical and Subtropical Asia	Fl, Fol	Potted, Garden plant, Lawn cover
49	<i>Maerua oblongifolia</i> (Forssk.) A.Rich. VSN; Bansal:379	Desert caper	Capparaceae	Climber	India, Pakistan, Saudi Arabia and Africa	Fl, Fr	Avenue, Road divider, Hedge, Garden plant
50	<i>Mitragyna parvifolia</i> (Roxb.) Korth. VSN; Bansal:143	Desi Kadam, Kaim	Rubiaceae	Tree	India, Myanmar	Fl, Fr, Fol, P.f.	Avenue, Religious/ Ceremonial, Medicinal
51	<i>Moringa oleifera</i> Lam. VSN; Bansal:237	Sonjana, Drum Stick	Moringaceae	Tree	India, Pakistan, Mexico, Central America	Fol, Fl, Fr	Avenue, Medicinal, Edible
52	<i>Ocimum basilicum</i> L. VSN; Bansal:116	Maurava	Lamiaceae	Herb	India, Africa, Asia (South East)	Fol	Potted, Garden plant, Edible, Religious/ Ceremonial
53	<i>Oxystelma esculentum</i> (L. f.) Sm VSN; Bansal:249	Rosy milkweed vine	Apocynaceae	Climber	Egypt, Tanzania, Yemen, S. China, Australia	Fl, Fol	Garden plant
54	<i>Pedaliium murex</i> L. VSN; Bansal:304	Bada Gokhru, Vilayatigokhru	Padaliaceae	Herb	India, Pakistan, Sri Lanka, Tropical Africa, Madagascar	Fol, Fl, Fr	Potted, Garden plant, Medicinal, Succulent

	Name of species	Vernacular name	Family	Habit	Nativity	Ornamental attribute	Ornamental purpose
55	<i>Pergularia daemia</i> (Forssk.) Chiov. VSN; Bansal:388	Pergularia	Asclepiadaceae	Herb	Africa, Peninsula, Iran, Indo-China.	Fl,Fr,Fol	Garden plant
56	<i>Phyla nodiflora</i> (L.) Greene VSN; Bansal:195	Jal Buti	Verbenaceae	Herb	Tropics & Subtropics	Fl	Lawn cover, Garden plant
57	<i>Plectranthus barbatus</i> Andrews VSN; Bansal:338	Patharchoor	Lamiaceae	Herb	Eritrea to Tanzania, Arabian Peninsula India, S. Central China	Fol, Infl	Potted, Garden plant, Medicinal, Indoor foliage
58	<i>Pluchea lanceolata</i> (DC.) C.B. Clarke VSN; Bansal:248	Khar jaal, Rasna	Asteraceae	Herb	Senegal, Chad, Tanzania, S. Iran to India	Infl	Potted, Garden plant, Edible
59	<i>Plumbago zeylanica</i> L. VSN; Bansal:447	Chitrak	Plumbaginaceae	Herb	Tropics & Subtropics	Fl, Fol	Garden plant, Medicinal
60	<i>Portulaca quadrifida</i> L. VSN; Bansal:274	Bichubuti, Wild Purslane	Portulacaceae	Herb	Tropical America, Asia, Africa, Pakistan	Fl, Fol	Potted, Garden plant, Succulent
61	<i>Pulicaria wightiana</i> (DC.) C.B.Clarke VSN; Bansal:377	Sonela	Asteraceae	Herb	India	Fl	Potted, Garden plant
62	<i>Rhynchosia viscosa</i> (Roth) DC. VSN; Bansal:398	Sticky Snoutbean	Fabaceae	Climber	India, China, Tropical Africa	Fl, Fr	Garden plant
63	<i>Rivea hypocrateriformis</i> Choisy VSN; Bansal:363	Gawal kakri	Convolvulaceae	Climber	India	Fl, Fol	Garden plant
64	<i>Saccharum bengalense</i> Retz. VSN; Bansal:115	Munja	Poaceae	Herb	India, Iran, Myanmar	Infl	Garden plant
65	<i>Saccharum spontaneum</i> L. VSN; Bansal:112	Kaans	Poaceae	Herb	India, Tropical West Asia	Infl	Garden plant, Medicinal
66	<i>Salvadora oleoides</i> Decne. VSN; Bansal:313	PeelaJaal	Salvadoraceae	Tree	India, China (Southern), Japan	Fol, Fr, P.f.	Avenue, Medicinal, Edible, Religious/Ceremonial
67	<i>Salvadora persica</i> L. VSN; Bansal:312	Peelu, Jaal	Salvadoraceae	Tree	India, China (Southern), Japan	Fol, Fr, P.f.	Avenue, Medicinal, Edible, Religious/Ceremonial
68	<i>Setaria viridis</i> (L.) P.Beauv. VSN; Bansal:213	Chepu	Poaceae	Herb	Old world and Central & SE. Australia.	Infl	Garden plant
69	<i>Sida acuta</i> Burm. f. VSN; Bansal:264	Wire weed	Malvaceae	Herb	Tropics and Sub tropics	Fl	Potted, Garden plant, Medicinal
70	<i>Sida cordifolia</i> L. VSN; Bansal:245	Heart leaf Sida	Malvaceae	Herb	Tropical & Subtropical Asia to N. Australia	Fol, Fl	Potted, Garden plant, Medicinal
71	<i>Sida rhombifolia</i> L. VSN; Bansal:268	Arrow leaf Sida	Malvaceae	Herb	Tropical and Subtropical Old World	Fol,Fl	Potted, Garden plant, Medicinal
72	<i>Silene conoidea</i> L. VSN; Bansal:305	Catchflies	Caryophyllaceae	Herb	India, America	Fl, Fr	Potted, Garden plant
73	<i>Solanum virginianum</i> L. VSN; Bansal:296	Satyanashan, Jharkeladoo	Solanaceae	Herb	Indo-China,Tropical Africa, China,	Fol,Fl	Potted, Garden plant, Medicinal
74	<i>Spergula arvensis</i> L. VSN; Bansal:326	Abrojito	Caryophyllaceae	Herb	India, C & S. America, Europe, Mediterranean region	Fol,Fl	Lawn cover, Potted, Garden plant
75	<i>Stellaria media</i> (L.) Vill VSN; Bansal:329	Chick weed	Caryophyllaceae	Herb	Eurasia, Africa	Fol,Fl	Lawn cover, Potted, Garden plant
76	<i>Suaeda vermiculata</i> Forssk.ex J.F. Gmel VSN; Bansal:320	Seep weed	Amaranthaceae	Herb	Macaronesia, S. Medit., Sahara and Arabian Peninsula, India, Sri Lanka.	Fol	Lawn cover, Potted, Garden plant, Succulent
77	<i>Tamarix aphylla</i> (L.) H. Karst. VSN; Bansal:301	Phras	Tamaricaceae	Tree	Sahara to India	Fol, P.f.	Avenue, Garden plant, Hedge/fencing
78	<i>Taraxacum javanicum</i> Soest VSN; Bansal:367	--	Asteraceae	Herb	India, Java	Fl	Potted, Garden plant
79	<i>Tecomella undulata</i> (Sm.) Seem. VSN; Bansal:408	Roheda	Bignoniaceae	Tree	Afghanistan, India, Iran, Oman, Pakistan	Fl	Avenue, Garden plant Religious/ Ceremonial, Road divider
80	<i>Tinospora sinensis</i> (Lour.) Merr. VSN; Bansal:104	Guduchi, Ghiloye	Menispermaceae	Climber	West Indies, India, China, Yunnan	Fol	Garden plant, Potted, Medicinal

	Name of species	Vernacular name	Family	Habit	Nativity	Ornamental attribute	Ornamental purpose
81	<i>Trianthema portulacastrum</i> L. VSN; Bansal:350	Saati	Aizoaceae	Herb	Tropical Africa, Asia, Tropical America	Fol	Lawn cover, Garden plant, Edible, Medicinal
82	<i>Tribulus terrestris</i> L. VSN; Bansal:300	Bhakri, Puncture Vine	Zygophyllaceae	Herb	Mediterranean region, Tropical America,	Fl, P.f.	Lawn cover, Garden plant, Medicinal
83	<i>Trichodesma indicum</i> (L.) Lehm. VSN; Bansal:319	Jnglikaronja, Chotakalpa	Boraginaceae	Herb	Philippines, Afghanistan, Thailand	Fl	Garden plant, Lawn cover
84	<i>Triumfetta rhomboidea</i> Jacq. VSN; Bansal:260	Buur Bush, China Bush	Malvaceae	Shrub	Tropical America, Asia, Africa	P.f., Fl, Fol	Lawn cover, edicinal
85	<i>Withania somnifera</i> (L.) Dunal VSN; Bansal:190	Ashvagandha, Aksand	Solanaceae	Herb	S. Europe, China, Africa, Myanmar	Fol, Fr	Potted, Garden plant, Medicinal
86	<i>Wrightia tinctoria</i> R.Br. VSN; Bansal:278	Indra jao	Apocynaceae	Tree	India, Myanmar	Fl,Fol	Avenue, Road divider, Medicinal, Ceremonial
87	<i>Zygophyllum indicum</i> (Burm.f.) Christenh. & Byng VSN; Bansal:240	Fagonia	Zygophyllaceae	Herb	India, Pakistan, Afghanistan and Africa	Fl,Fr	Garden plant, Potted
88	<i>Actiniopteris radiata</i> (SW.) Link VSN; Bansal:468	Fern	Pteridaceae	Fern	India, Africa, Peninsula, Iran, Myanmar.	Fol	Potted, Garden plant

Fl—Flower | Fol—Foliage | Fr—Fruit | Infl—Inflorescence | Lf—Leaf | P.f.— Plant form | S—Seed | St —Stem.

to explore and document the multipurpose ornamental plants. In Rewari region of Aravalli Hill Ranges, 42 wild exotic wild ornamental plants were reported by Bansal et al. (2022).

Many ornamental plants are also used for ethnomedicinal purposes by poor and marginal people living in rural and remote areas in different countries. Rao et al. (2021) explored the traditional medicinal uses of wild flora from Charkhi Dadri district of Haryana state. In this study, researchers mentioned that many ethnomedicinal ornamental plants, viz., *Boerhavia diffusa*, *Salvadora persica*, *Tribulus terrestris*, *Withania somnifera* and many other plants.. Some of these may be used as soil binder, fencing, and field protectors like *Caesalpinia bonduc*, *Capparis decidua*, *Clerodendrum phlomidis*, *Grewia tenax*, *Barleria prionitis*, and *Leptadenia pyrotechnica*. These wild plants are naturally growing on the walls of the buildings, in crop fields, foot hill areas, and their flowers and appearances easily attract the interested people. These plants can easily be domesticated and maintained at a very low cost.

The appealing characteristics of WOPs reflect their high ornamental and aesthetic potential. In recent years, many such WOPs have gained a lot of importance in the exploitation of many sorts and in the generation of revenue among the poor (Olsen 1998). Many plant species have been imported and domesticated beyond their natural ranges as a result of increased globalization, and some of them have established and sustained persistent populations without human intervention. The floriculture sector is always on the lookout for new

goods, technology, and market gaps to fill. In comparison, the price of domestication and maintenance of WOPs species is likewise relatively low (Negrelle et al. 2012; Maroyi 2022).

WOPs may play a significant role in environmental planning for pollution abatement, wasteland development, afforestation, social & rural forestry, and open-air & interior landscaping (Ciftcioglu et al. 2019). The attractive WOPs can be grown in pots inside house, banks, hospitals, malls, institutions, and offices. These wild ornamental plants may play a valuable role in planning of environmental issues, landscaping of urban housing, waste land development, house designing, and afforestation (Bansal et al. 2022).

WOPs are intricately intertwined with our culture, literature, socioeconomic life, romance, and poetry (Rahnema et al. 2019). Incorporating such WOPs in daily use may be a fascinating but risky endeavor. OPs have become quite popular inside houses, workplaces, banks, hospitals, guesthouses, hotels, and other buildings. Cultivation of these plants could be useful commercially as well as for the conservation of rare, vulnerable, and endangered endemic plant species. Wild plants of the Aravalli hills have potential uses like the gum resin is collection performed since ever by the tribal populace utilizing conventional tapping method (Soni 2010). The significant position of ornamentals has been studied for 'habitat formation' and 'wildlife attraction' making it potentially useful (Ciftcioglu et al. 2019). Landscape gardening and bio-aesthetic planning have been popular in recent years as a way to create environmentally



Image 1. Prominent wild ornamentals: A—*Abrus precatorius* L. | B—*Caesalpinia bonduc* (L.) Roxb. | C—*Gymnosporia emarginata* (Wild.) Thwaites | D—*Maerua oblongifolia* (Forssk.) A.Rich. | E—*Grewia tenax* (Forssk.) Fiori | F—*Pergularia daemia* (Forssk.) Chiov. | G—*Rivea hypocrateriformis* Choisy | H—*Commiphora wightii* (Am.) Bhandari | I—*Wrightia tinctoria* R.Br. © Authors.

friendly human habitats.

Botanic Gardens are the primary site of introduction and domestication of WOPs as they effectively manage the interchange of ornamental seeds and plant materials both within and outside the country (Niazian & Naloussi 2020). Organized expeditions by individual botanists, gardeners, and connoisseurs, should help in collection

of these plants which are not commercially explored and only found in wild (van Kleunen et al. 2018). These plants can be collected in the wild, introduced, acclimatized to various altitudinal zones, multiplied, made accessible to nursery men for sale, and distribution to potential marketable places. These plants will benefit greatly from research into their phenology and numerous



Image 2. Prominent wild ornamentals: A—*Tecomella undulata* (Sm.) Seem. | K—*Crateva religiosa* G.Frost | L—*Barleria prionitis* L. | M—*Tribulus terrestris* L. | N—*Capparis decidua* (Forssk.) Edgew. | O—*Abutilon indicum* (L.) Sweet | P—*Pedalium murex* L. | Q—*Silene conoidea* L. | R—*Cleome gynandra* L. © Authors.

floricultural characteristics. The origin of potential uses of ornamentals has deep roots association to the animal empire. Several ornamental plants act as source of foodstuff, fiber, fuel, lumber, and medication. WOPs have an essential part in urban and rural environmental

planning for pollution abatement, social & rural forestry, wasteland development, afforestation, and outdoor & indoor landscaping (Babu et al. 2017; Sangma & Chaurasiya 2021).

It is universally accepted that the remarkable

potential of novel ornamentals from wild sources exists throughout the globe (Janakiram et al. 2021; Bansal et al. 2022). In spite of having a rich and diverse plant wealth in many countries, especially in India majority of the exotic plants are given due weightage in floricultural trades as compared to the indigenous wild plant species. There is a need to take-up R&D work by interlacing the fraternity of botanists, floriculturists, and agriculturists. In our country, an enormous variety of wild plants from varied habitats can be grown in the botanical gardens and used in landscaping. Such wild plant species are awaiting the attention of garden lovers, specialists, nurserymen, town planners, florists, and experts from different industries for their popularization. Further, the introduction of such plant species in botanical gardens, regional stations and nurseries is highly recommended for their conservation, propagation, and dissemination (Cong & Han 2020). WOPs wealth will be also helpful in the improvement and evolution of new ornamental cultivars and will play pivotal role in the floriculture industry. Hence, domestication and concerted breeding efforts of WOPs of Aravalli hills may provide many useful ornamental plants for posterity.

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Rhynchostegiella menadensis (Sande Lac.) E.B. Bartram and *R. scabriseta* (Schwagr.) Broth.: two new records of mosses (Brachytheciaceae: Bryophyta) for peninsular India

– V.K. Rajilesh, C.N. Manju & R. Prakashkumar, Pp. 22543–22547

Notes

Installation of hot boxes for conservation in the last nursery roost of Greater Horseshoe Bats *Rhinolophus ferrumequinum* in Austria

– Lukas Zangl, Alexander Gutstein, Wolfgang Paill, Edmund Weiss & Peter Sackl, Pp. 22548–22550

New prey record of giant ladybird beetle *Anisolemnia dilatata* (Fabricius) (Coccinellidae: Coleoptera) feeding on Som Plant Aphid *Aiceona* sp.

– Suprakash Pal, Biwash Gurung, Ponnusamy Natarajan & Partha Sarathi Medda, Pp. 22551–22555

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Book Review - Under the Feet of Living Things

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