RESEARCH ARTICLE

MEDICINAL USES OF RARE, ENDANGERED AND THREATENED (RET) PLANT SPECIES

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Abstract: Whenever a species or creature is threatened or endangered, it indicates it has gone extinct, is fast disappearing, or has too few populations to survive. The term "extinction" refers to the end of a species' existence. Almost every form of agroclimatic and edaphic situation known to man can be found in this country. About 2500 species of plants are used in India's indigenous medical system. The red data book, on the other hand, identifies 427 Indian medicinal plants as endangered species, with 28 deemed extinct, 124 endangered, 81 rare, and 34 unknowns. An endangered species, according to the International Union for Conservation of Nature (IUCN), is threatened with extinction due to an organism or population of organisms, habitats, excessive mortality, or environmental changes.

Keywords: Conservation, Endangered, Extinction, IUCN, Medicinal plants, Red data book

INTRODUCTION

An endangered species is one that is on the verge of extinction. After the International Union for Conservation of Nature (IUCN) Red List classifications of Endangered (EN) and Critically Endangered (CR), the IUCN Schema has the second most severe conservation state for wild populations (Rogers, 2003). The IUCN Red List classified 3079 animals and 2655 species of plants as endangered (EN) around the earth in 2012 (Mace *et al*., 2008; IUCN, 2001). Many countries have laws protecting conservation-based species: for example, banning hunting, restricting or protecting land development. Population numbers, trends and status of species conservation can be found in the list of organisms according to population (Chaudhuri, 2007). Although labeled in the list, the IUCN Red List is a global conservation assessment system for species that contain "data deficiency" (DD) species - more data is needed before their status can be determined and evaluated - and the IUCN species are widely assessed through the species assessment process (Chase and Reveal, 2009). Species of "Near Threatened" (NT) and "List Concern" (LC) status were assessed and found to have a relatively strong and healthy population, although declining. In contrast to their common uses elsewhere, the list specifically uses "endangered species" and "threatened species": "endangered" (EN) species between "vulnerable" (VU) and "endangered" (CR) species. If "threatened" species, those species are determined to be endangered, endangered, or critically endangered. The popular medicinal plants are under much more threat than non-medicinal species. Due to deforestation in forest area and community, the land is degraded, soil fertility and soil productivity are badly affected, so the nutrition deficiency and lack of in-situ moisture conservation in the hilly tribal area resulted in the destruction of RET species. Also, there is a protection problem of arable and non-arable land so most of the RET species are destroyed because of biotic interference (Rao *et al*., 2019). Nowadays the global market of herbal drugs has increased. These RET plants are in need of proper conservation and management before it lost forever.

Enumeration of ret plants (Sharma *et al*., 1993; Sharma and Sanjappa, 1993; Rao *et al*., 2019; Saxena and Brahman, 1996; Reddy, 2006).

Hypericum gaitii

Family: Hypericaceae

Common name: St John's wort

Habit: It is a shrub having much terete branches; leaves are oblanceolate and elliptic-obling, glabrous, pale beneath, acute to sub-acute; Flower is yellow about 7 cm diameter; 1.2- 1.3 cm filament; 1.8-1.9 cm style; 2.5-2.8 cm petal and 0.8-0.9 cm sepal. Sepals ovate, petals obovate; 5 bundled stamens. Capsule conical. Flowers are bisexual, actinomorphic, about 3.5-5.5 cm across, pedicel about 5-12 mm long, up to 25 mm long in fruit, bracts small foliaceous persistent, elliptic caducous, sepals 5, quincuncial, subequal, ovate-lanceolate, free from the base, margins serrulate, apex acute, glandular punctate with black glands, persistent, about 8- 13 x 4-6 mm across, petals 5, obovate, yellow or golden yellow, veined prominently, punctate with black glands, about 24-30 x 15-20 mm across. Stamens 30 in each bundle or fascicles 3, free, filaments linear, filiform, glabrous, about 15 mm long, anthers dorsifixed, yellow, connectives with usually with black amber gland. Ovary superior, globose, 1-5 locular, syn carpus, about 6-7 mm long, ovules many, axil placentation or pseudo central placentation, styles 5, free from the base, erect, about

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10-12 mm long. Fruit capsule septicidal, ovoid- sub globose, about 13-18 x 7-9 mm across, apex obtuse, punctate with resinous vesicles, with style persistent. Seeds numerous, ellipsoid-cylindric, about 1-1.2 mm long, subacute on both ends, testa scalariform-reticulated, slightly carinate, reddish brown, embryo slender. It is the threatened species, mostly found near the Mountain Rivers or streams. It locates in the tropical moist deciduous forest of Similipal Biosphere Reserve (SBR), Keonjhar, Angul district, Odisha, India.

Medicinal value

These species have been used as traditional medicine for wound healing, bactericidal and anti-inflammatory properties. The essential oils extracted from these species have antioxidant properties which can use in medicinal purposes.

Eria meghasaniensis

Family: Orchidaceae

Common name: Orchid

Habit: Epiphytic orchid with 2-10 pseudobulb in a plant. Pseudobulb: Old pseudobulb leafless, dorsiventrally compressed, obliquely node with 2-3 internodes. Leaves; 2-4 on the top of the stem, narrowly elliptic lanceolate, acuminate, 75-135 x 15-30mm; persistent for more than one season. Inflorescence; Sub-terminal, erect, 1-3 per plant from behind the leaf base, 10-16 flowers. Flower; Shortly pedicellate, not wide-opening, inodorous; perianth unequal, mucronate, sparingly dotted with linear glands. Sepals are off-white, 3-veined, Petals white, oblong-ovate. Lip sessile. Capsule; Ellipsoid, (10 x 4) mm, shortly pedicelled, glabrous, caduceus; seed oblong or obliquely oblong with a golden-brown hair like testa.

Medicinal value

A number of constituents obtained from different orchid parts such as alkaloids, flavonoids, phenanthrenes, terpenoids, bibenzyl derivatives, nitrogenous organic heterocyclic molecules and other biologically active compounds have pharmacological effects for the humans and animals. Some species have also shown antibacterial activities which are more effective against *Escherichia coli*, *Staphylococcus aureus*, *Pseudomonas aeruginosa*, *Bacillus pumilus* and *Pseudomonas putida*. Different species are used in Taiwan, Korea and Japan to treat various pathologies like stomachache, night sweats, to strengthen the kidneys. Also used to recover quickly after childbirth or to induce abortion and also reported that the leaves and pseudobulbs of the species are used against burns.

Heritiera fomes

Family: Malavaceae

Common names: Sunder, Sundri, Jekanazo

Habit: Heritiera fomes is a medium-sized evergreen tree growing to a height of 15 to 25 metres (49 to 82 ft). The roots are shallow and spreading and send up pneumatophores. The trunk develops buttresses and is grey with vertically fissured bark. Trees with girths of 2 metres (6 ft 7 in) used to be found but these large trees have mostly been harvested for their timber. The trunk has few large branches and the canopy is open. The leathery leaves are elliptical and tend to be clustered at the ends of the twigs [14]. The pink or orange bell-shaped flowers are each about 5 mm (0.2 in) across. They form in panicles, each flower being either male or female. The fruit carpels are up to 5 cm (2.0 in) long and 3.8 cm (1.5 in) wide. They ripen between June and August and the seeds germinate readily. It found in Bhitarkanika mangrove forests, Kendrapada district, Odisha.

Medicinal value

The bark of H. fomes is rich in procyanidins. The ethanol extract has been shown to have antioxidant properties. It also shows antimicrobial activities against *Staphylococcus aureus*, *Bacillus subtilis* and *Pseudomonas aeruginosa* and is non-toxic in brine shrimp toxicity tests.

Gnetum ula

Family: Gnetaceae

Common name: Monkeys bridge

Habit: *G. ula* is a lofty woody dioecious climber with dichotomous branches that means, jointed branches at the node, bark is thick scaly, young shoots jointed and swollen at the insertion of the leaves. Stem is brown in colour, cylindrical in shape, with a characteristic odor and slightly bitter in taste, fibrous in nature. Gnetum shows a typical tap root system which is profusely branched. The leaves (9-10) are arranged in decussate pairs. They often lie in one plane giving the appearance of a pinnate leaf to the branch. The leaves are large and oval with entire margin and reticulate venation as also seen in dicotyledons. Some scaly leaves are also present. Inflorescence is spicate, axillary with many superposed copularconnate bracts called collars, each collar containing unisexual sessile flowers; The male strobilus is compound and has a long slender axis bearing 10-25 whorl of bracts (collars). About 12-25 male flowers are arranged in three to six rings above each collar. A single ring of 7-15 imperfect female flowers or abortive ovules is present just above the male flowers. Seeds are endospermous enclosed with three envelopes forming a pseudo-fruit. It is a woody climber having branches with swollen nodes. It is found in Western Ghats near Khandala, forests of Kerala, Nilgiris, Godawari district of Andhra Pradesh and Orissa.

Medicinal value

Gnetum ula is widely used to cure various ailments like Rheumatism, Bronchitis, piles, inflammation, jaundice, arthritis

Dimorphocalyx glabellus

Family: Euphorbiaceae

Common name: Weliwenna

Habit: Trees, to 8 m high; bark smooth, yellowish-grey; blaze dull yellow, branchlets slender, greyish-white. Leaves simple, alternate; stipule lateral, ovate, acute; petiole 5-20 mm long, slender, grooved above,

glabrous; lamina 5-17.5 x 2-7 cm, oblong, elliptic-lanceolate, elliptic-oblong or ovate-lanceolate, base acute, apex acute, obtusely acuminate or acuminate, margin entire or distantly dentate or crenate, glabrous, dark green above, paler beneath, coriaceous; lateral nerves 7-13 pairs, parallel, slender, faint, inter costae reticulate, faint. Flowers unisexual, white; male flowers: 8-10 mm across, in axillary cymes; calyx copular, unequally 5-lobed, 4-5 mm long; petals 5, 10 x 5 mm, oblong, obtuse, imbricate; disc glands adnate with petals; stamens 10-20, form a short column in 2 whorls; filaments thick; anthers dorsifixed; female flowers: solitary or 2-3 together, terminal or leaf-opposed; calyx deeply 5 partite, 2.5 cm long, oblong, erect, imbricate, petals as in male flower; disc annular; ovary superior, ovoid, 3-celled, densely hairy, ovule one in each cell; styles 3, connate at base, bifid, spreading. Fruit a capsule, 2 x 2.2 cm, obovoid, 3-lobed, surrounded by persistent calyxlobes; seeds yellowish mottled with brown, ellipsoid. Flowering is from February–October and fruiting is from November–January. As in all species of Di morpho calyx, flowers are diecious.

Medicinal value

The leaves are used in the treatment of dyspepsia and rheumatism in Ayurveda. It is mainly used as folk medicines.

Drypetesas samica

Family: Putranjivaceae

Common name: Lamaku

Habit: A small evergreen tree of 10-15m. Leaves coriaceous, elliptic 8-18*3-6cm, shortly acuminate base oblique rounded or broadly cunate entire lateral veins spreading petioles 5-10mm. Leaves are glossy green, coriaceous. Flower monoecious, in axillary clusters. Fruit globose, deep red when ripe. Common throughout the state. Male flowers in axillary fasciles 10mm diameter, on pedicels 5mm, stamens 8-12. Female flowers solitary axillary on pedicels 4- 6mm, sepals 5mm, ciliate stigmas sessile. Drupes ellipsoid 2*1.5cm, shallowly furrowed densely brown appressed pubescent. It is found in Mahendragiri, Ganjam, 135m; Southern range, Puri, in Odisha.

Medicinal value

Freshly prepared decoction of bark is applied locally in toothache.

Cordia macleodii

Family: Borginaceae

Common name: Dahipalas, Dhengan

Habit: Small tree of 9–12 m height, trunk about 50–60 cm in diameter. Bark: Light green, 12–15 mm thick; reddish color inside, forming exudate on injuring, branchlets white tomentose. Leaves: Broadly ovate, shiny dark green on the dorsal surface and light green colored on the ventral surface with numerous hairs, 20–25 cm × 15–18 cm, entire, obtuse or bluntly acuminate, somewhat surgose above and with numerous white crystlyths, 3–5 nerved fromor from near the base, base often deeply cordate. Petiole: 3.7-7.5 cm long. Leaf opposed or extra-axillary. Flowers: Yellowish white in color, polygamous, subsessile, in dense paniculate terminal and axillary tomentose cymes; male flowers with a rudimentary ovary but without style or stigma. Calyx: 8 mm long, obconic, densely tomentose, ribbed; lobes short, obtuse. Corolla: Yellowish white in color, 1.6 cm long; lobes 8 by 2.5-3 mm, exceeding the tube, spathulate-oblong, obtuse, veined. Stamens: Usually 6, exerted; filaments hairy at the base. Anthers: Anthers of male flowers large, those of hermaphrodite flowers smaller. Drupes: Subglobose, yellowish, somewhat tomentose, apiculate, seated on the broadly campanulate toothed or lobed, ribbed calyx. In Odisha it is found in Mayurbhanj district and Ganjam district.

Medicinal value

The plant is used ethnomedicinally for various purposes like healing wounds (leaf, bark), mouth sores (leaf), treating jaundice (bark) and also as an aphrodisiac (seed) by the tribal people of Odisha and Madhya Pradesh.

Cycas beddomei

Family: Cycadaceae

Common names: Beddome's cycas

Habit: It is having erect, solitary stems, arborescent, appear like a small palm with a distinct trunk of up to 1.5m high. It is covered with the remnants of leaf bases. There are 20-30 leaves in the crown, each leaf 90 cm long, stiff, lanceolate, pinnate, with 50-100 pairs of leaflets, these 10-17.5 cmlong and 3–4 mm wide, and angled forward at 45 degrees; the leaf petiole bears minute spines. The female cones are open, with sporophylls 15–20 cm long, with pink-brown coloured tomentose down, with two ovules. The cones emerge in November to December, ripening in March to May. The lamina margin is strongly toothed, with an acuminate point. The sarco testa is yellow to brown. The male cones are solitary, ovoid, 30 cm long and 7.5 cmbroad, with an apical spine and rhomboid sporophyll face. It is rarely found in Mahendragiri hills and Southern part of Similipal Biosphere Reserve in Odisha.

Medicinal value

The male cones of the plant are used in Ayurvedic medicine as a cure for rheumatoid arthritis and muscle pains. The male cone extracts are used to prepare a health tonic by the local Yanadi tribes and rural communities. The pith is harvested often for use in abortion. The main therapeutic activities of the species are aphrodisiac, debility, antioxidant, antiulcer, wounds and boils, skin diseases, arthritis and diabetic.

Homalium nepalense

Family: Salicaceae

Common name: Kakhara, Khakhada, Danimari

Habit: it's a small medium sized tree. Habitat: moist deciduous forest. Bark creamy white. It found in Mayurbhanj, Ganjam, Koraput district.

Medicinal value

The leaf is used as ointment for healing wounds.

Siphonodon celastrineus

Family: Celastraceae

Habit: It's a canopy tree (15-30 m high); Bole markedly fluted (30-50 cm diam.); crooked or straight (bole 15-25 m long); buttresses present (rarely buttresses up to 1.5 m high) or absent. Leaves spaced along branches, spiral (leaves occurring singly at a node and arranged spirally up the branchlet), simple (a leaf composed of a single blade); petiole present, not winged, attached to base of leaf blade, not swollen; leaves broadest at or near middle or rarely broadest below middle, (4.0-) 9.0-11.0 (-23.0) cm, (3.5-) 5.0-6.0 (-9.0) cm; symmetric, serrate to dentate (toothed), not dissected or lobed, sub-acute, venation pinnate, secondary veins open, not prominent, but visible, intramarginal veins absent; leaves lower surface pale green or green, upper surface dull green, indumentum (hairs) absent; absent; domatia absent; stipules absent. Inflorescence axillary, flowers arising from a single point, cones absent; flowers unisexual, unisexual with male and female flowers on the same plant, stalked, flowers with many planes of symmetry, 3.0 (c.) mm long, diameter small (up to10 mm diam.) (3-5 mm diam.); perianth present, with distinct sepals and petals whorls, inner perianth white; 5, free; stamens 5, present, free of each other, free of the perianth; ovary superior, carpels joined (when more than one), locules 5; styles solitary, 1. Infrute scence arising from single point, fruit 25.0-40.0 (-60.0) mm long, 20.0-60.0 mm diam., yellow when mature or yellowish green, not spiny, non-fleshy, simple, indehiscent, berry; seeds 100, barely visible (to 1 mm long), not winged, narrow (longer than wide), seed less than 1 mm diam.

Medicinal value

It has invitro cytotoxic activity, so this medicinal plant species used by traditional doctors in treating cancer. Its root is used in traditional Thai medicine for the treatment of inflammation, abscess, skin diseases and as a bone tonic.

Symplocos racemosa

Family: Symplocaceae

Common name: Lodh Tree, Lodhra plant

Habit: Trees, to 10 m high, bark 1 cm thick, greyish, smooth; blaze creamy yellow; branchlets glabrous. Leaves simple, alternate, estipulate; petiole 6-15 mm long, slender, glabrous, grooved above; lamina 7-15 x 3-6 cm, elliptic or elliptic-obovate, base acute, apex acute to acuminate, margin crenate-serrate, recurved, glabrous, shiny, coriaceous; lateral nerves 6-12 pairs, glabrous, pinnate, slender; inter costae reticulate, prominent. Inflorescence axillary racemes, up to 14 cm long, tomentose. Flowers are bisexual, in spikes, to 12 cm long, fulvus tomentose, many flowered; bracts ovate, cauducous; bracteoles early cauducous; calyx tube adnate to the ovary, lobes 5, sepals triangular, acute, glabrous; petals 5; stamens numerous, unequal, many seriate, adnate to the corolla tube; anthers short, ovary inferior, ovules 2-3 in each cell, pendulous from the inner angle; style filiform. Fruit a drupe 15 x 5 mm, ovoid, glabrous, shallowly furrowed, yellow, stone woody; seeds 1-2, oblong. It is found in the Sambalpur, Keonjhar, Mayurbhanj district of Odisha.

Medicinal value

Powder of lodhra is an important ingredient of Ayurveda skincare packs as it nourishes the skin and gives benefits in acne, wrinkles, and other skin problems. The bark of a tree has been traditionally used as a uterine tonic and in the treatment of gynecological problems.

Uraria picta

Family: Fabaceae

Common name: Dabra

Habit: Annual plant, a plant that completes its life cycle from germination to death within one year, herb 50 to 30 cm to 1 m, with leaves alternate, imparipinnate. Stem; Round and flat, covered with short hairs and crooked. Lower leaves are 1-3-foliolate, upper 5-9-foliolate. Leaflets of the lower leaf 2-8 cm long, 2-3 cm broad, ovate; of upper leaves, 7-25 cm long, 5-25 mm broad, ovate-lanceolate, pointed, often variegated, stalk 3.5-6.5 cm long. Inflorescence is 10- 70 cm long, carried on a 0-5 cm long stalk. Bracts are 1.4-2.5 cm long, long pointed, completely covering the bud, deciduous. Flowers stalks are 6-9 mm long. Sepals are 4-5 mm long. Flowers are purple, pink or bluish, 8-9 mm long. Fruit 5-9 mm long, with 3-6 segments, each 2-3 mm broad, glabrous, smooth, polished, folded on one another. It found in Ganjam and Keonjhar district of Odisha.

Medicinal value

In Ayurveda, it is used in the treatment of asthma, dysentery, delirium, ulcers, malarial fevers, fractures of bones, inflammation of chest and diarrhea, catarrhs, bleeding piles and many other ailments. The roots of the plants mainly contain alkaloids, saponins, flavonoids, glycosides, proteins, steroids, tannins and phytosterols.

CONCLUSION

The use of plants for healing by any cultural group is integrally related to local concepts of the nature of disease, the nature of plants, and the world view of the culture. The physical and chemical properties of the plants themselves also bear on their selection by people for medicines, as does the array of plants available forpeople to choose from. For a species to be considered endangered by the IUCN it must meet certain quantitative criteria which are designed to classify taxa facing "a very high risk of extinctions". An even higher risk is faced by critically endangered species, which meet the quantitative criteria for endangered species. Critically endangered plants are listed separately. There are 6147 plant species which

are endangered or critically endangered. In the present study different RET category plant species were studied and their morphological characters along with their medicinal uses were recorded from different parts of Odisha.

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