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Morphotaxonomic authentication of ethnomedicinal plants of Ranchi district, Jharkhand, having anti-urolithiatic and anti-cholelithiatic properties

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Abstract- Four ethnomedicinal plants have been taken in account for morphotaxonomic study; they are, *Curcuma caesia* Roxb. (family- Zingiberaceae), *Alpinia galanga* (L.) Willd. (family- Zingiberaceae), *Grewia asiatica* L. (Family- Tiliaceae/ Grewaceae) and *Amaranthus spinosus* Linn. (Family- Amaranthaceae). The knowledgeable endemic-ethnic people of Ranchi district (Jharkhand) show these plants very useful in successful management of Urolithiasis (kidney-stone) and Cholelithiasis (gall bladder stone). The aim of this work is to provide correct identification of plants and authenticate Baidyas' and local healers' phytotherapy.

Key words: Morphotaxonomic study, urolithiasis, cholelithiasis, Phytotherapy

INTRODUCTION

Medicinal plants are nature's gift to human wellbeing to make disease free communities leading to healthy lifestyles. Ethnobotany¹ deals with man-plant relationships, which are both need-based and culture-based. In India, use of medicinal plants is the part of time-honored tradition and are inseparable from local livelihood as they have long been collected, consumed and managed through local customs and knowledge. Dependence on local flora is the main characteristic of indigenous ethnic people.

Morphotaxonomic study² includes the study of external features of plant with their habit and habitat for their identification.

Ranchi district is a fast-growing town, urolithiasis and cholelithiasis- like life-style diseases are very frequent and

common. These are very painful diseases; surgical operation is the only way of instant cure followed in allopathy; but, they can be managed very successfully under phytotherapy of ethnomedicine.

MATERIALS & METHODS

1. Field survey and Plant collection -

The field survey has been conducted in different places of Ranchi district³ (23°15'N to 23°25' N latitude and 85°15' to 85°24' longitude; elevation 651m from the sea-level) of Jharkhand state. Interviewed many Baidyas, knowledgeable persons of local healers, etc., who threw light on anti-urolithiatic and anti-cholelithiatic ethnomedicinal plants, which are used by them for their preparations against urolithiasis and cholelithiasis.

For morphotaxonomic study, the collected plant samples with local names are as Nil - kuntha, Kulinjana, Phalsa and Kanta Gandhari.

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2. Identification -

The selected plants are identified as *Curcuma caesia* Roxb. (family- Zingiberaceae), *Alpinia galanga* (L.) Willd. (family- Zingiberaceae), *Grewia asiatica* L. (Family- Tiliaceae/ Grewaceae) and *Amaranthus spinosus* Linn. (Family- Amaranthaceae) respectively on the basis of their morphological characters, habit and habitat comparing with described characters mentioned in "The Botany of Bihar and Orissa" B.S.I. Calcutta, by H.H.Haines (1921-25), and with the help of University Department of Botany, RU, Ranchi. The plant species has been illustrated by photos in its habitat.

RESULT & DISCUSSION

Morphotaxonomic study of selected four ethnomedicinal plants are as follows -

1. *Curcuma caesia* Roxb.⁴

English Name - Blue ginger, Black turmeric, Black zedoary

Local Name- Nil-Kuntha, kali haldi

Locality- Khatanga, Ormanjhi

Flowering and Fruiting Time :- March to August

Parts used- Leaf, Rhizome

Phytochemical Constituents- Flavonoids, steroids, terpenoids, alkaloids, camphor, ar-curcumene, anthocyanin, β -cyanins

Properties- Antibacterial, antiviral, antifungal, anti-inflammatory, antipyretic, analgesic, diuretic, etc.

Taxonomic position-

Kingdom	-	Plantae
Division	-	Magnoliophyta
Class	-	Monocotyledons
Order	-	Zingiberales
Family	-	Zingiberaceae
Genus	-	<i>Curcuma</i> , L.
Species	-	<i>C. caesia</i> Roxb.



Fig. 1: Herb

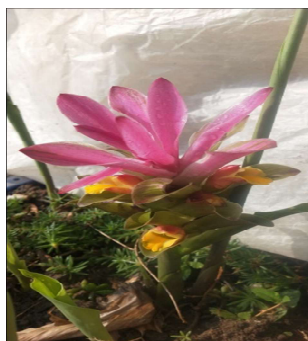


Fig. 2: Flower



Fig. 3: Rhizome

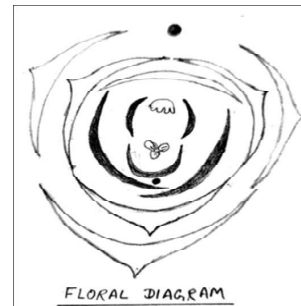


Fig. 4: Floral Diagram

Curcuma caesia Roxb.

Morphological description - An 4' erect perennating herb; Root- rhizomatous and tuberous; nodulose tuberous root; rhizome- 2-6 cm in diameter, aromatic, dark brown surface, greyish blue within., Stem- 3'ht. composed of the convolute leaf-sheath. Leaf- usually green present in a group of 5-20, with dimension 1-2'X5-6", lanceolate, with a deep ferruginous purple colour down the region of the lamina which penetrates to the lower surface. Inflorescence- 15-20 cm long spike, which arises before the opening of leaf, i.e. in the month of march. Flower- pale yellow, shorter than their bracts, bracts are pinkish red in colour; calyx-green, 10-15mm long obtuse & 3-toothed, corolla-long tubular, 3 pale yellow petals. Androecium- one fertile stamen. Gynoecium- one pistil, 3 carpels fused, stigma-funnel-shaped. Fruit- capsule, seed-endospermic.

Floral Formula- $\% \text{ } \overline{\text{K}}_{(3)} \text{ C}_{(3)} \text{ A}_1 \overline{\text{G}}_{(3)}$

Ethno Botanical Significance- This is an important plant in Ayurveda. It manages urolithiasis and cholelithiasis very well. The general preparation used – 1cm of rhizome and 9-11 black pepper are grinded into paste with rice cleaned water; recommended this to 6 days every month upto 6 months.

2. *Alpinia galanga* (L.) Willd.⁵

English Name- Greater galangal/ Siamese ginger

Local Name- Galangal, Kulinjana

Locality- Gangutoli, Ormanjhi

Flowering & Fruiting time- April-June, July-August.

Parts used- Leaf and Rhizome

Phytochemical Constituents- Flavonoids, carotol, eucalyptol, 5-hydroxy methyl furfural, camphor, methyl cinnamate, guaiol, 1,8-cineol, α -fenchyl acetate

Properties- Antipyretic, antidepressant, analgesic, antiseptic, anti-ulcer, anti-inflammatory, anti-cancer, etc.

Taxonomic Position-

- Kingdom - Plantae
- Division - Magnoliophyta
- Class - Monocotyledons
- Order - Zingiberales
- Family - Zingiberaceae
- Genus - *Alpinia*
- Species - *A. galanga* (L.) Willd.

Morphological description- An 8' high aromatic herb, very large. Root rhizomatous. Stem- leafy stem, erect, terminate in an inflorescence. Leaf- simple, alternate, petiolate, lanceolate, length to breadth ratio is 3:1 (16"X3.5"), Ligule- short rounded ciliated, Venation-parallel, Inflorescence- Racemose, Flower- 3" long, yellow-white colour with red veins, fragrant, zygomorphic, bisexual, shortly pedicellate, epigynous, trimerous, bracteate, bracteolate; bracteole is obliquely posterior. Bracts- 2, small ovate, white colour with pink- bordered tip, dimensions-1.5"X1.4" and 0.7"X0.7". Perianth- 6 in two whorls (3+3), distinguishable into calyx and corolla; Calyx-3 unequal, greenish white- 1.5"X0.6", 1.1"X0.5" and 1"X0.4", valvate aestivation. Corolla-3 unequal, imbricate aestivation. Brightly coloured labellum; one functional stamen-1.3"long, bilobed; 2 staminodes-5mm long; pistil-one, 1.7" long, tricarpeal, syncarpous; inferior ovary, bearing a flexible, terminal style that passes through the groove in between the anther lobes and the stigma is funnel shaped. Fruit- capsule, seeds- endospermic.



Fig. 5: Herb Fig. 6: Inflorescence Fig. 7: Rhizome
Alpinia galanga (L.) Willd

Anaflexistylous Flower – A unique floral mechanism is observed in *Alpinia galanga* (L.) Willd. flowers, that is, they attain pistillate stage in the morning (Fig.10, stigma is exposed outward); whereas, in the evening they attain staminate stage (Fig.11, stamen is exposed outward over the pistil). This is due to the flexibility of style.



Fig. 8

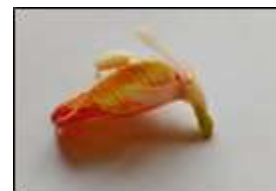


Fig. 9

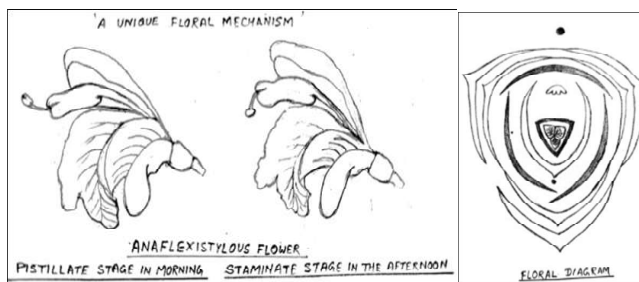


Fig. 10

Fig. 11

Fig. 12

Floral Formula:- $B_{3c}, B_{2d}, \frac{1}{2} \bar{Q}^{\uparrow} K_{(3)} C_{\bar{3}} A_1 \bar{G}_{(3)}$

Ethno Botanical Significance- Its leaves and rhizomes are very useful medicine. For Cholelithiasis, decoction of leaf with honey is taken in empty stomach in the morning. For Urolithiasis, rhizome powder, 1-2 gm with coconut water and Mishri, 10gm – this composition is taken twice a day for 6 days in a month, for 6 months.

3. *Grewia asiatica* L.⁶

English name- Sand paper raisins

Local name- Phalsa

Locality- 4-petalled flowering plant- Gangutoli, Ormanjhi and 5-petalled flowering plant- Burdwan Compound, Lalpur.

Flowering and Fruiting time- March to August

Parts used- Leaf, Bark and Fruit

Phytochemical Constituents- Flavonoids, phenols, anthocyanins, pelargonidin-3,5-diglucoside, quercetin 3-O-β-D-glucoside, catechin, quercetin, vitamin A, B3 & C.

Properties- Antimicrobial, antilithiatic, antiaging, anticancer, antiplatelet, antihyperglycemic, anti-inflammatory, analgesic, etc.

Taxonomic Position-

- Kingdom - Plantae
- Division - Magnoliophyta
- Class - Dicotyledons
- Order - Malvales
- Family - Tiliaceae/ Grewaceae
- Genus - *Grewia*
- Species - *G. asiatica* L.

Morphological Description- A 5 meter tall tree shrub, deciduous, branches extend radially from central stem;

Leaf- simple, alternate, stipulate, sub-orbicular, often coarsely doubly serrate, 2-8.5"X1.5-6.8"; Petiole-0.3-0.5" long, slender, pulvunus; colour of new leaf- maroon, whereas, old leaf-dark green; 5-7 basal nerved regular, oblique, cordate and permanent, pedicel- 0.4", peduncles (0.7") many; Nodal arrangement: one leaf, two stipules, 3-5 floral bunches, each bunch bears 3 floral buds. Inflorescence- umbel; Flower- yellow, 0.6" long, petals shorter than sepals, Calyx- 4-5 sepals, free, greenish yellow; Corolla- 4-5 petals, free, yellow, usually with a large nector gland at the base, valvate aestivation; Androecium- many stamens, free, 0.15" long; Gynoecium- 1 carpel, 0.25" long; long Gonophore; Fruit- 0.35" diameter, globose, purple coloured, highly nutritive and edible.



Fig. 13: Tree shrub of *Grewia asiatica* L.



Fig. 14: Four-petaled Flower

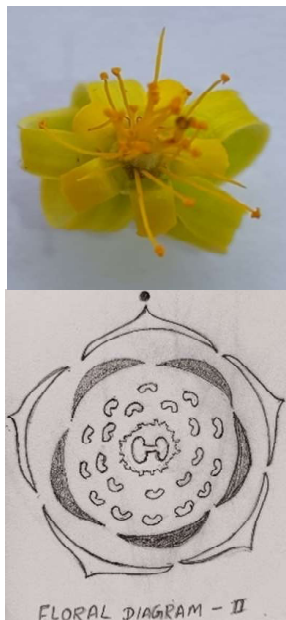


Fig. 15: Five-petaled Flower

Grewia asiatica L.

Floral Formula- $\oplus \text{ } \overline{\text{K}}_{3-5} \text{ } \overline{\text{C}}_{3-5} \text{ } \overline{\text{A}}_{\infty} \text{ } \overline{\text{G}}_2$

Ethno Botanical Significance- Its ripe fruits are very nutritive; 20-50 ml juice daily shows amazing effect. Decoction of leaf and stem bark is used in treatment of urolithiasis and cholelithiasis.

4. *Amaranthus spinosus* Linn.⁷

English name- Spiny amaranth, spiny pigweed

Local name- Kanta gandhari

Locality- Ormanjhi

Flowering and Fruiting time- Whole year

Parts used- Whole plant

Phytochemical Constituents- Flavonoids, phenolics, betalains, carotinoids, vitamin C, spinasterol, diglycosides, hesperidin, rutin, quercetin.

Properties- Antimicrobial, antipyretic, diuretic, anti-anaemic, anti-inflammatory, analgesic, hepatoprotective, galactagogue, etc.

Taxonomic Position-

- Kingdom - Plantae
- Division - Magnoliophyta
- Class - Dicotyledonae
- Order - Caryophyllales
- Family - Amaranthaceae
- Genus - *Amaranthus*
- Species - *A. spinosus* Linn.



Fig.16: A twig

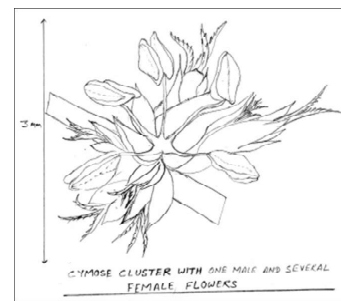


Fig.17- Cymose cluster with one male and several female flowers

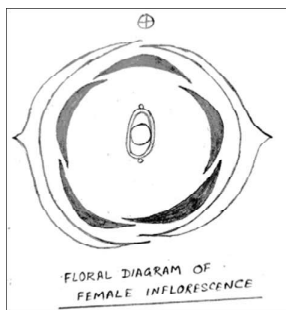


Fig.18

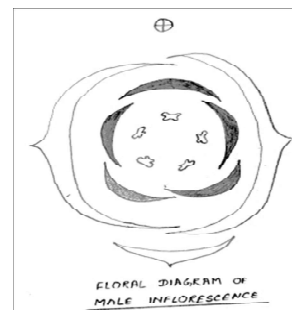


Fig.19

Sahu & Kandir- Morphotaxonomic authentication of ethnomedicinal plants of Ranchi district, Jharkhand, having anti-urolithiatic and anti-cholelithiatic properties

Morphological Description- An annual herb, seed propagated, plant height attains more than 1 metre, erect or spreaded on the ground; tap root; slender to thick woody stem. Nodal arrangement includes a large single leaf, an axillary branch, two small inflorescences and two pairs of sharp prominent spines. Petiol-3cm, leaf-5cm long, simple, alternate, entire. Leaf lamina-2.5cm wide. Inflorescence 8cm axillary cyme. Flower- tiny, regular, bisexual, bract and bracteoles present. Perianth-4-5 tepals, 5 stamens, 2-3 carpels. Fruit-1-seeded, berry or nut; seed- endospermic, round, black shiny of 1mm dia.

Floral Formula- $Bx, Bxl, \oplus P_3 A_{(5+5 \text{ STAMINOSES})} \underline{G}_{(2 \text{ or } 3)}$

Ethno Botanical Significance- Very useful medicinal plant, leaves are used as Saag by ethnic people. For Urolithiasis, ash of whole plant(500mg-1g) with clarified butter(5g), twice a day and for Cholelithiasis, decoction of whole plant with *Curcuma caesia* rhizome powder is used.

CONCLUSION

Owing to its rich and diverse flora and fauna, Ranchi district significantly has become a very stable ecosystem with tremendous regenerating self supporting and sustained power of biodiversity.

The ethnomedicinal role of *Curcuma caesia*, *Alpinia galanga*, *Grewia asiatica* and *Amaranthus spinosus* in the management of urolithiasis (kidney-stone) and cholelithiasis (Gall- stone) among the respective patients is very miraculous. These plants are easily available in Ranchi district whole year. They have stone- dissolving capacity, thus, they are popularly used.

This research work provided the authentication of Baidya's work as well as the local awareness in phytotherapy with correct identification of these medicinal plants. The conservation of these plants are today's need.

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REFERENCES

1. **Shah N. C. 2008.** Ethnobotany in India. In: Selin H. (eds) Encyclopaedia of the History of Science, Technology, and Medicine in Non-Western Cultures. *Springer*, Dordrecht. https://doi.org/10.1007/978-14020-4425-0_8578
2. **Singh Gurcharan. 2010.** Plant Systemics: An Integrated Approach, Third edition; Science Publishers. 1-14 & 56-90
3. <https://ranchi.nic.in/>
4. **Haines H. H. 1921-25.** The Botany of Bihar and Orissa, Vol.I-III, Part VI, B.S.I. Calcutta. 1135
5. **Haines H. H. 1921-25.** The Botany of Bihar and Orissa, Vol.I-III, Part VI, B.S.I. Calcutta. 1146
6. **Haines H. H. 1921-25.** The Botany of Bihar and Orissa, Vol.I-III, Part II, B.S.I. Calcutta. 94
7. **Haines H. H. 1921-25.** The Botany of Bihar and Orissa, Vol.I-III, Part V, B.S.I. Calcutta. 761
