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Gum yield plants of Kawarabandh Region

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Abstract
The present work is carried out to focus on the Kawarabandh region (Tahsil Amgaon) flora of gum yielding plant. The said work, no doubt, helps to academicians and agriculture scientists for better understanding of distribution of gum yielding plant taxa growing in the Tahsil, either wild or cultivated.

Keywords: Kawarabandh, gum yielding, plant taxa

Introduction

Proteins, enzymes, muscle fibers, polysaccharides and gummy exudates are the natural polymers being used effectively in pharmaceutical dosage forms. Natural gums (gums obtained from plants) are hydrophilic carbohydrate polymers of high molecular weights, generally composed of monosaccharide units joined by glucocidic bonds. They are generally insoluble in oils or organic solvents such as hydrocarbons, ether, or alcohols. Gums are either water soluble or absorb water and swell up or disperse in cold water to give a viscous solution or jelly. On hydrolysis they yield arabinose, galactose, mannose and glucuronic acid. Based on solubility in water gums are classified as soluble, insoluble and partially soluble gums. Certain gums dissolve in water to form a transparent colloidal solution (e.g. Gum Arabic). Gums such as gum tragacanth, gum karaya do not dissolve in water but swell up into a jelly-like mass. However, if sufficient amount of water is added they yield a thick transparent solution. Partially soluble gums first form a swollen jelly by dispersing in water and become solution on addition of more water. Gumresins are a combination of resins and true gums with a mixture of characteristics of both. Certain gumresins contain small amount of essential oil they are called oleo-gumresins. Small quantities of resins exude on the surface of the trunk due to injury by wind, fire, lightening or wound caused by animals.

Natural gums including acacia, Ghatti, Karaya, Locust bean, Albizia, Khaya, Guar, Tragacanth and Xanthan, are obtained as exudates or extractives from the bark of stems, branches and roots of various plants. Plant families notable for the production of gums are Anacardiaceae, Combritaceae, Meliaceae, Rosaceae and Rutaceae. Various reasons have been advanced for the production of gums by plants, including: as products of normal plant metabolism; as a protective mechanism against a pathological condition afflecting the plant; and as a consequene of infection of the plant by microorganisms.

The plant based polymers have been studied for their application in different pharmaceutical dosage forms like matrix controlled system, film coating agents, buccal films, microspheres, nanoparticles, viscous liquid formulations like ophthalmic solutions, suspensions, implants and their applicability and efficacy has been proven. These have also been utilized as viscosity enhancers, stabilizers, disintegrants, solubilizers, emulsifiers, suspending agents, gelling agents, bioadhesives and binders.

By keeping the abovesaid usage of gum yielding plant, the present work is carried out to know the flora of Kawarabandh region yielding Gum.

Plan of Work

The present work has been undertaken with an aim to account gum yeilding plant of Kawarabandh region. The present work has been carried out during September 2017 to march 2018. During this period several visits and field trips undertaken and more than 25 localities have been visited. Total 10 specimens collected from different locations of the Salekasa tehsil. Some of them visited frequently during the documentation. Identified specimens were confirmed by matching them with authentically identified species deposited in the herbarium, Department of Botany, Bhawabhuti Mahavidyalaya, Amgaon.

Herbarium sheets were prepared by employing standard universally accepted method. Properly identified plant specimens have been deposited in the herbarium of Botany, Bhawabhuti Mahavidyalaya, Amgaon. Every attempt has been made to adopt the most recent and correct nomenclature. The valid name is followed by basionym. Genera and species are provided with diagnostic description, local name if available, phonological data, reference to the illustration if available, information about habit and habitat. Herbarium vouchers are cited for each species. Bibliography of the references cited in the text is given at the end.

Enumeration of Taxa

Acacia Leucophloea: Polhill, R, M. 1990 Legumineuses In. Flore des Mascareignes, Vol80. J. Bosseret a. (Plate 1, Fig. 1& 2)

Fam: Fabaceae.

Local name: safed babul, haribawalhiwar.

Des: *Acacia leucophloea* is a large thorny tree attaining a height of 35 m and a diametr at breast height of 100 cm. Trunk stout, dividing into several large diameter branches. Open-grown specimen have a characteristic wide umbrella-like crown. Bark white to yellowish gray, smooth, exfoliating in long strips, on old trees becoming black and rough. Leavesbipinnately compound, with 4-13 pairs of

pinnae, each with 5-30 pairs of leaflets. Spines 2-5 mm long, at the base of leaves. Flowers conspicuous, light-yellow to cream in colour, in pendunculateglomerules aggregated in terminal or axillary panicles 5-merous, corolla 1.2-2 mm long. Ponds yellow, green or brown in colour, flat and fairly straight, 10-20 cm long, 5-10 mm wide, containing 10-20 smooth, oblong seeds, dark brown in colour, 6 x 4 mm in size.

Locality: Kawarabandh.
Dstrib: Throughout India.

Uses of Part: The consumption of cooked, germinated seeds as vegetable(hale) is reported from java. Stem and roots produce a gum which is used for medicinal purposes. The pods and foliage are a protein-rich fodder source.

***Acacia Nilotica*:** Ecocrop, 2012; orwa et al, 2009; Fagg et al, 2005.
(Plate 1 Fig. 3 & 4)
Fam: Fabaceae.
Local name: Babul, babool, Egyptian acacia, sant tree.
Des: Babul is a medium sized, thorny, nearly evergreen tree that can reach a height of 20-25 m but may remain a shrub in poor growing conditions. The trunk is short, thick (1m in diameter) and cylindrical, covered with grey bark. The crown may be flattened or rounded. The root system depends on the growing conditions and subspecies; a deep taproot in dry conditions and
extensive lateral roots in flooded conditions. The leaves are 5-15 cm long, alternate and compound with 7 to 36 pairs of elliptical, 1.5-7 mm long x 0.5-2 mm broad, grey-green, hairy leaflets. Fiowers are sweetly scented and bright to golden yellow in colour. The fruits are linear, flattened, narrow indehiscent pods, 4-22 cm long and 1-2 cm broad, dark-brown to grey in colour and glabrous or velvety. The pods contain 8 to 15 elliptical, flattened bean-shaped dark seeds.
Locality: Zaliya.
Dstrib: All Over India.

Uses of Parts: Although the tree it basically cultivated for its bark, its leaves, pods and gums also have various uses in the world of medicine. The bark of the Acacia Niloticasecretsa special gum which is popularly known as the babul gum and is used as a key ingredient of various medicines the leaves and the fruits of the plant are rich in tannin and gallic acid.

***Albiziaprocera*:** flora of sa, (2003) Author: Dr J. P. Roux.
(Plate 1 Fig. 5& 6)
Fam: Fabaceae – Mimosoideae.
Local name: Karak, kalsis, siris, white siris.
Des: *Albiziaprocera* is a tree with an open canopy, up to 30 m tail and truck of 35(60 max) cm in diameter; bole straight or crooked, up to 9 m. Bark smooth, pale grey-green, yellowish-green, or brown with horizontal ridges; underbark green, changing to orange just below the surface. Leavesbipinnate with 2-5 pairs or subopposite pinnae; rachis 10-30 cm, glabrous with a gland 1-2.5 cm above the base; gland narrowly elliptical, 4-10 mm long. Inflorescence composed of penduculateglomerules collected in an axillary sparsely puberulous panicle up to 30 cm long; peduncle (0.8 min).Fruits rich red or reddish-brown, flattened pods 10-20 x 1.8-2.5 cm, chartaceous, glabrous with distinct marks over the seeds mature pods each containing 6-12 seeds.
Locality: Binzali.
Dstrib: Throughout India.
Uses of Part: The bark can provide tanning material. It is used in India for tanning and
dyeing. When injured, the stem exudes large amounts of reddish-brown gum that is chemically similar to, and used as a substitute for, gum Arabic. The leaves are known to have insecticidal
and pesticidalproperties. Pods and fallen leaves should be considered not a undesirable litter but as potential energy sources. Anogeissuslatifolia S. Al-Assaf, V. Amar, in 2009, P.A.Williams, G.O. Phillips in 2003.
(Plate 2 Fig. 7 & 8)
Fam: Combretaceae.
Local name: Axlewood, Dhawra, raam.
Des: Axlewood is a small to medium-sized, deciduous tree growing up to 20 metres, occasionally to 35 metres, tall. The bole can be unbranched for up to 15 metres. The tree is often harvested for its gum and tannins. It also yields a good quality wood and is planted in soil stabilization programmes. A plant of lowland, driver to moist tropical areas, where it is found at elevation up to 1,300 metres. Trees are easily damaged by fire. Its flower are an important pollen source for bees.
Locality: Salekasa.
Dstrib: All Over India.
Uses of Part: The gum that exudes from the trunk, known as ghatti gum, has been used in sweetmeats and as an emulsifier in the food industry. The plant is used in treating snake bites and scorpion stings in India. The tree is a good survivor on eroded land. It is used in river bank stabilization. The tree contributes to soil nutrient cycling, exhibiting high leaf-litter decomposition rates. Ghatty gum is an exudation obtained from the wood.

***Magnifera indica*:** Shah K.A., Patel M.B., Patel R.J., Parmar P.K. (2010)
(Plate 2 Fig. 9 &10)
Fam: Anacardiaceae.
Local Name: Mango, Anbah, Manga Agaci.
Des: Mango leaves are alternately arranged, lanceolate (long and narrow) shaped, 6 to 16 inches in length, and leathery in texture. The leaves are pinkish, amber, or pale green-colored when
young and become dark green at maturity. Documented properties and actions, anti-asthmatic, antiseptic, antiviral, laxative. The mango is a large, long-lived tree with a broad, rounded canopy, generally 20-100 ft tall. Cultivated orchids are kept at 20-30 ft. Leaves are lanceolate to linear, (4-16 long x 1-2 wide), dark green, with prominent light-colored veins and entire margins.
Locality: Powaritola.
Dstrib: All Over India.

Uses of Part: It is slightly heavy to digest and nourishing for the body. Sweet mango is a great aphrodisiac and improves immunity and strength. Overall, it has a very nourishing and calming effect on the body. Mango tree bark has astringent properties which make it useful to pacify kapha and pitta disorders. Mango tree roots can treat IBS and Diarrhea. Mango young leaves also show similar effect.

***Moringa oleifera*:** Olson, M. E (2010). Leone A, Spada A, Battezzati A, Schiraldi A, Aristil J, Bertoli S (2015)
(Plate 2 Fig. 11 & 12)
Fam: Moringaceae.
Local name: Drumstick tree, ben oil tree, benzoil tree.
Des: *Moringa oleifera* is a fast-growing, deciduous tree that can reach a height of 10-12 m (32-40 ft) and trunk diameter of 45 cm (1.5 ft). The bark has a whitish-grey colour and is surrounded by thick cork. Young shoots have purplish or greenish-white, hairy bark. The tree has an open crown of drooping, fragile branches and the leaves build up a feathery foliage of tripinnate leaves. The flower are fragrant and asexual, surrounded by five unequal, thinly veined, yellowish-white petals. The flower are about 1.0-1.5 cm (1/2) long 2.0 cm (3/4) broad. They grow on slender, hairy stalks in spreading or drooping flower clusters which have a length of 10-25 cm.
Locality: Salekasa.
Dstrib: All Over India.
Uses of Parts: Moringa leaves can be consumed fresh, cooked or as powder. It can be used in tea, in capsules, added to beverage, sprinkled in salads or soup. etc. There is endless ways to incorporate Moringa into the diet. The list of ways to apply Moringa powder depends only on your imagination Moringa leaves and powder have no proven bad side effects. A dosage of just two or three spoonfuls of Moringa leaves powder provides a substantial amount of most people's iron, calcium, vitamin A, and vitamin C.

***Butea monosperma*:** C. Damino, P. Esposito, P. Curir, B. Ruffoni. DOI; 10.17660/ActaHortic. 1988.
(Plate 3 Fig. 13 & 14)
Fam: Fabaceae.
Local name: Bastard Teak, Parrot Tree, Palaash.
Des: It is a medium-sized dry season-deciduous tree, growing to 15 m. It is a slow growing tree, young trees have a growth rate of a few feet per year. The leaves are pinnate, with an 8-16 cm petiole and three leaflets, each leaflet 10-20 cm long. The flowers are 2.5 cm long, bright orange-red, and produced in racemes up to 15 cm long. The fruit is a pod 15-20 cm long and 4-5 cm broad.
Locality: Kawarabandh.
Dstrib: India.

Uses of Part: It is used for timber, resin, fodder, medicine, and dye. The wood is dirty white and soft and being durable under water, is used for well-curbs and water scoops. Spoons/Ladles made of his tree are used in various Hindu rituals to pour Ghee into the fire. Good charcoal can be obtained from it. The leaves are usually very leathery and not eaten by cattle. The leaves were used by previous generations of people to serve food instead of plastics of today.

Madhuca longifolia: Matthew, K.M. 1983, Hara, H. et. al. 1978-1982, Duke, J.A. 1989.
(Plate 3 Fig. 15 & 16)
Fam: Sapotaceae.
Local name: Butter Tree, Mahua, Indian Butter Tree.
Des: The Mahua tree is large and deciduous. This variety has broad leaves and a open canopy.
It grows to a height of 10-12 meters. Stem are thick, short and truncated. The trunk is rugged with thick and dark bark.There are numerous branches. They are spreading and form a thick shapely dome. All leaves drop in winter. Flower are the first to arrive in February-March. They have an intoxicating fragrance and are edible. They corolla is fused, fleshy and sweet to taste. Wild animals like enjoy the fermented fallen fruit. Native people make an alcoholic beverage from the flower. Leaves crowded near ends of branches, 6-20 cm, ablong, coriaceous, petiole 3-4 cm. This plant is the symbol for revatinakshatra.
Locality: Binzali.
Dstrib: All Over India.
Uses of Part: It is cultivated in warm and humid regions for its oleaginous seeds between 20 and 200 kg of seeds annually per tree, depending on maturity, flower and wood. The fat is used for the care of the skin, to manufacture soap or detergent, and as a vegetable butter. It can be used as a fuel oil. The seed cakes obtained after extraction of oil constitute very good fertilizer.

***Azadirachta indica*:** Siddoqui 1942. Pp. 278-279, Sidhu et al. pp. 69-75. Anna Horsburgh, Porter 2006.
(Plate 3 Fig.17 &18)
Fam: Meliaceae.
Local name: Neem, nimtree, indian lilac.
Des: Azadirachtaindica is a tree in the mahogany family Meliaceae. It is one of two species in the genus Azadirachta, and is native to india, Burma, Bangladesh and Pakistan growing in tropical and semi-tropical regions. Neem is a fast-growimg tree that can reach a height of 15-20 m, rarely to 35-40 m. It is evergreen, but in severe drought it may shed most or nearly all of its leaves. The branches are wide spread. It blossoms in spring with the small white flowers. It has a straight trunk. Its bark is hard rough and scaly, fissured even in small trees. The color of the bark is brown grayish. The leaves are alternate and consist of several leaflets with serrated edges. Its flower are small and white in color.
Locality: Salekasa.
Dstrib: Throughout India.
Uses of Part: Neem leaves are dried in india and placed in cupboards to prevent insects eating the clothes and also in tins where rice is stored. Neem leaves are dried and burnt in the tropical regions to keep away mosquitoes. These flowers are also used in many indian festivals like ugadi. Neem oil is also used for healthy hair.Neem gum is used as a bulking agent and for the preparation of special purpose food.
***Lanneacoromandelica*:** Sasidh. Et al. 1996, Gamble, fl. Pres. 1918.
(Plate 4 Fig. 19 &20)
Fam: Anacardiaceae.
Local name: Indian Ash Tree, Mandhol, Modhad.
Des: A deciduous tree with greyish-white or ash-coloured, bark, sometimes with black patches. Leaflets 5-11, ovate, elliptic-oblong or elliptic-lanceolate, glabrous, membranous. Minute, yellowish, sessile in long panicles at the ends of leafless branches. Drups smooth, glabrous. Flowering and Fruiting Time January-july.
Locality: Zaliya.
Dstrib; Throughout India.
Uses of Part: The tree exudes a gum which is not of much value, and the bark is employed in native medicine. The wood is used for packing cases. The gum is used for paper sizing. It is used in calico printing. The wood is used for carving, turnery and furniture. The tender shoots are

relished by elephants and the leaves are eaten by cattle. The crows are fond of fruits.

Fig 1 & 2: *Acacia Leucophloea*

Fig 3 & 4: *Acacia Nilotica*

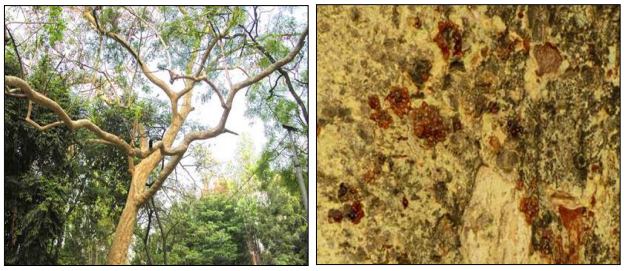

Fig 5 & 6: *Albizia Procera*

Fig 7 & 8: *Anogeissus Latifolia*

Fig 9 & 10: *Magnifera Indica*

Fig 11 & 12: *Moringa Oleifera*

Fig 13 & 14: *Butea Monosperma*

Fig 15 & 16: *Madhuca Longifolia*

Fig 17 & 18: *Azadirachta Indica*

Fig 19 & 20: *Lannea Coromandelica*

Result and Discussion

During the present investigation total 10 Gum Yielding Plants were documented. It is suggested that though flowers, fruits and other vegetative part of some taxa are no doubt attract people to use product of gum yielding plant directly or indirectly in daily life such as use of flower, fruit, gum and other vegetative part of plant.

The present work, no doubt, helps to academicians and agriculture scientists for better understanding of distribution of gum plant taxa growing in the Tahsil, either wild or cultivated.

Further, voucher specimens made in the present work will enriched the herbarium of the parent institution.

References