
rees of
Melghat
FOR THE CURIOUS
50
MELGHAT
Melghat Tiger Reserve
Golden Jubilee Celebration
22nd February 2023 To 22nd February 2024
DIVYA BHARATHI IFS
JEYKUMARAN IFS

To the trees which made us

THINK

Trees of Melghat

Foreword

We often find ourselves so focused on human affairs that we tend to overlook the silent guardians of our land. The trees, those stoic sentinels, have a story to tell, a narrative that is often hidden from our eyes, which is unveiled in this book: "Trees of Melghat." This book is a revelation, a revelation that peels back the layers of these botanical giants to reveal their untold secrets of pollination, the ways in which flowers have evolved to achieve reproductive success, and their invaluable role in sustaining life. As the Minister of Forests, I believe it's time we acknowledge the silent statesmen of our environment, and this book is the perfect introduction to their world.

SUDHIR MUNGANTIWAR

Minister (Forests, Cultural Affairs, Fisheries),Government of Maharashtra

In the tranquil embrace of Melghat Tiger Reserve, a comprehensive and insightful exposition is being offered in this book -"Trees of Melghat." This meticulously crafted volume unveils a botanical tapestry, providing profound ecological revelations concerning 50 unique trees that thrive in this pristine wilderness. The book illuminates the intricate relationships between pollinators and flowers and the delicate balance between them due to which life thrives in forests. "Trees of Melghat" is certain to be a valuable resource for scholars, conservationists, and nature enthusiasts alike.

B VENUGOPAL REDDY IAS

Principal Secretary (Forest), Maharashtra

"Trees of Melghat" is an ode to the living legends that sustain life in Melghat, an ode to nature's poetry. Each chapter is an expedition into the lives of these arboreal wonders, revealing the intricate ecological choreography of 50 majestic trees. As we venture deep into the forest's embrace, we encounter the profound interconnectedness of all life. The way flowers in this landscape have evolved alongside pollinators is an important story to be told and shared. With the same wonderment that nature has inspired in me for decades, this book invites you to join on a journey of revelation and reverence for the exquisite tapestry of life in Melghat's woods, a story worth celebrating and safeguarding.

SHAILESH TEMBHURNIKAR IFS

Head of Forest Force (HoFF), Maharashtra

In a world where our attention is often captured by screens and social media, it's time to shift our focus to the real stars of nature – the trees. The authors invite you to journey with them through "Trees of Melghat." It's time to go beyond merely swiping right and left and dive deep into the hidden lives of these remarkable trees. This book is like unlocking a treasure trove of ecological secrets, a digital-age exploration of nature's mysteries. It's time to hit refresh on our understanding of the natural world and start swiping through the lush pages of Melghat's green wonderland

MAHEEP GUPTA IFS

Chief Wildlife Warden, Maharashtra

As the Field Director of the Melghat Tiger Reserve, I'm privileged to witness the secrets of this unique forest every day. Yet, even in this wondrous realm, there are enigmas, stories waiting to be unraveled. "Trees of Melghat," penned by Divya Bharathi and Jeykumaran, peels back the layers of our silent companions, revealing the intricate tales that lie beneath the bark. This book is an invitation to look beyond identification and delve into the ecology of these 50 trees. It's a call to observe, appreciate, and protect the intricate web of life in Melghat. Let this be your guide to a deeper connection with nature!

JAYOTI BANERJEE IFS

Field Director, Melghat Tiger Reserve

Why?

DIVYA BHARATHI

Flowers are rarely noticed in trees. And the summers in Central Indian forests are dismissed as dry and boring. We wish to bring focus to them both. In summers most trees bloom and that is when life is at peak in these jungles. Pollination, dispersal and a whole world of fascination awaits in these trees in 'boring summers'.

JEYKUMARAN

Imagine a life where, what everyone knows about you is just your name. That is the closest many of us reach to nature- knowing the name of the bird that flew past, or the tree we walked by. And all we learnt is, how adults name things and nothing else. This is a book we wrote for ourselves, to remind us of the child - to whom, everything around, is worth exploring.

Flowering starts from the base of the tree and slowly reaches upwards, just like a flame and with the red coloured flower, no wonder Palash is called as the 'Flame of the forest. However there are also yellow coloured and white coloured Palash flowers, but they are very rare variations. Apart from stealing our hearts does these bright red flowers on leafless branches have a reason for their appearance?

Flowers that are evolved to attract birds for pollination are often bright red or vibrant orange as the eyes of birds are most sensitive to these colours. The flowers also come up in leafless branches as it increases the visibility of the flower to a bird. Have you smelled the flower of a Palash? You will notice there isnt much of a fragrance. Because birds have a poor sense of smell, the tree has not even wasted its energy creating fragrant flowers. The next time you see Palash or any bright red flower, start looking for these quirks.

palash

BUTEA MONOSPERMA

The first tree anyone in Melghat would notice is Teak. But is identifying really knowing a tree? Locally known as 'Sipna', Teak was earlier placed in the family of 'Verbenaceae' for the quadrangular arrangement of leaves, meaning a leaf pair above will be at a 90 degree angle compared to the leaf pair below. Teak needs strong sunlight to grow well (Light demander) and this quadrangular arrangement allows the leaves to maximise the amount of sunlight that the tree receives.You can observe similar leaf pattern in Lantana too which also belongs to the family Verbenaceae.

But in recent times Teak has been placed in the Mint family (Lamiaceae), a family characterised by leaves containing essential oil. Try crushing the young leaves of teak and see your hands, to know why.

The flowers of Teak are also interesting in that they are protandrous i.e. they first function as male flower where the pollen is produced and is shed within few hours. Then the female part (stigma) matures and it starts to function as a female flower. This way the chances of in-breeding is reduced and also the space constraints between male and female parts in a small flower is overcome.

Many a times we observe that the leaves of Teak are papery and the nerves are visible. This is because of larvae of Teak skeletonizer (a moth) that chews through the entire leafy parts and their activity has increased over the years due to rise in average temperature of the region.

These things matter because if these leafy parts dont fall in the soil and decompose, the soil will not receive enough nutrition leading to decline in soil quality, and there will be reduction in new teak regenerations. So the next time you go into the forests of Melghat, start looking at the ground to see if the next generation of the forest is coming up or not.

saag

TECTONA GRANDIS

The tree belongs to the family Burseraceae displaying the striking feature of this family- Papery bark and peeling off in flakes. There is something very interesting in this tree.

Often you will find some red fruit like structures or a burst open flower like structure on the leaves of Garuga pinnata. Dont be fooled by this deceptive appearance. These are the 'galls' made by a gall insect.

The adult female of this insect lays eggs on the leaves of the tree. When the eggs hatch, the larvae begin to feed on the leaf blade. And as they start feeding on the leaf, they spit secretions which cause plants to increase production of growth hormones. As a result abnormal cell growth happens, similar to tumours in human, which is referred as the gall. The gall keeps growing and the larvae, happily trapped inside, continue to feed on the gall and grow. Once mature, the gall is split open like a flower by the insect, which carries on this reproduction cycle.

kekad

GARUGA PINNATA

Like all the trees in the Bauhinia genus, Bauhinia variegata also has typical horse foot shaped leaves and lengthy pods. The pod is the fruit which dries completely on the tree and when matured, begins to twist into a helix and finally explodes open to disperse seeds into the environment. This tree has successfully reached our gardens and cities as an ornamental tree thanks to the showy flowers.

Bauhinia variegata is also commonly known as Orchid tree but doesnt belong to the family of Orchids. Wonder why?

The flowers of this tree has a single petal which is dark and large compared to other petals, very similar to a part in orchid flower which is called as the 'lip'. In orchids, this is the part which acts as a landing platform for insects to then pollinate the flower. Is this what happens in Bauhinia? Keep observing.

kachnar

BAUHINIA VARIEGATA

Commonly known as silk cotton tree, the woody fruits of Bombax ceiba are packed with cotton like fibre ('bombyx' means silk in Greek). Surely no birds or insect would like to feed on such a fruit and yes, the dispersal is by wind.

However big the trunk of this tree looks, the wood is soft and hence you can find conical thorns on the bark of young trees to keep off the animals.

Flowers are bright red and often occur in leafless branches, similar to Palash (Butea monosperma). Bombax flower is also rich in nectar, thus attracts a lot of birds and bees.

These flowers go a step further and unite the stamens (Male part carrying pollen) at its centre which provide a stable landing site for the birds.

The tree is also a favourite nesting site for big birds as they are one of the tallest trees with well spaced branches and leaves. And dont miss out the Indian rock bees which too build their hives on this tree.

semal

BOMBAX CEIBA

The fruits of Ficus virens turn from green to milky white, on ripening. That is why the tree is commonly referred to as White fig. But the magic of this white Fig lies in the upcoming story. Two things to keep in mind before we begin.

One, Ficus virens is a monoecious tree- Meaning both male and female flowers are present in the same individual. This story is about such monoecious Ficus species. Second, what we think as fig fruits are just the fleshy receptacles inside which male and female flowers are attached to. We will call this fleshy part as figs for now and here we go.

Ficus trees have a unique form of fertilization. Each species of Ficus relies on a single species of wasp to pollinate it. And in turn, the wasp is also dependent on that Ficus species to breed. But how does this happen?

The Ficus tree has both male and female flowers inside the fig. The female fig wasp makes a hole and enters the fig, lays its eggs on the female flowers, and dies inside the fig.

Now one might ask, what if it lays on the male flower? That doesnt happen because these monoecious Ficus trees are also protogynous i.e. inside the fig, the female flowers mature first, and later the male flowers mature.

So after the eggs are laid, they hatch and wingless male and winged female wasps emerge. These males mate with the emerging females, bore exit tunnels out of the fig for the winged females to exit and in the end, die.

Parallely by now the male flowers in the fig would have also matured. The mated female wasps collect pollen from these male flowers, and fly off happily in search of the next Ficus tree- To lay the eggs on the female flowers and begin the cycle again.

But these female fig wasps are short lived and cannot live outside the figs for long. They should immediately find a mature female flower. But wait. Isnt it possible that the flowering season is complete by the time these female wasps emerge?

In an another species may be, but not in Ficus. At any point in time, there is always a female flower waiting for the female fig wasp and this happens by a phenomenon known as 'Asynchronous flowering'. It means, different Ficus individuals in a forest, flower at different times ensuring that atleast some Ficus tree is in flowering at any point in time.

And it is not just the wasps that benefit. Because the fruits are also available throughout the year, every wildlife in the forest receives assured food due to Ficus, and that is why it is also referred to as a 'Keystone tree'. If all this doesnt count as magic, then what else can?

pakhad

FICUS VIRENS

The first thing you will notice about bhirra (Chloroxylon swietenia) is its corky bark. This is an adaptation to fire, as it gets scorched during fires without harming the inner living tissues. The leaves of bhirra also contains a juice unpalatable to herbivores. This enables bhirra to survive well even in degraded and disturbed areas.

But this was until humans came. Remember the wood on which your local butcher chops the meat? That is the wood of bhirra thanks to its soft yet strong nature, due to which humans have exploited the tree to a large scale.

Try burning the leaves of bhirra during the sleepless mosquito nights. The smoke from this is found to kill mosquitoes, due to the essential oils present in the leaf.

Bhirra is pollinated by bees and interestingly also ants. Ants are generally considered as nectar robbers and are not good pollinators. Why? Because in most of the flowers, the stamens containing pollen are not along the petals but project outward. So ants just walk along the petals, rob the nectar and run away.

But look at the structure of flowers in bhirra. The nectar is in the centre of the flower and the stamens containing the pollen are along the petals, on the same plane in many flowers. So the ants often have to walk on the stamens to reach the nectar. As the ants are busy collecting nectar, the ventral side of the ant comes in contact with pollen and, voila! The pollen gets attached to the ant, the ant moves to the next flower and the magic of pollination takes over.

There are also some interesting studies on bhirra flowers coming from field. The general presumption among us is all flowers become fruits. Not so says these studies, where flowers produced during winters (around December) donot become fruits. Also bhirra at lower altitudes were found to produce more flowers than bhirra at higher altitudes. Try to observe and understand these things the next time you walk near a bhirra.

bhirra

CHLOROXYLON SWIETENIA

Visualise a young tree with a thorny bark like Semal (Bombax ceiba), which transforms into a mature tree with a flaky bark like Teak. This pretty much characterizes how the bark of Bridelia retusa transforms.

Locally known as Kasai, the flowers of this tree occur on leafless twigs unlike many flowers which occur alongside leaves on same twigs. This could be to give clear visibility and space for the pollinators.

And look at the flowers. Can you see the small, fan shaped frills? These are the petals of Kasai flower, which is very unique too.

Coming to the leaves, it is a regular feature in the dry deciduous forests of Central India for trees to have reddish leaves in the younger stage (Kusum, Mahua, Baheda for instance). The leaves of Kasai too have this trait, but before the leaves fall they turn into pinkish brown. You might observe this in some other trees too but why is that?

During the growing season, leaves are green because of chlorophyll, a pigment essential for photosynthesis. However during winters, the plant begins to reabsorb nutrients from the leaves, particularly nitrogen, to face resource shortages in the leaner seasons. This process triggers the breakdown of chlorophyll, revealing other pigments present in the leaf like Anthocyanin and Carotenoid which give red-pink-orange shade to the leaves.

kasai

BRIDELIA RETUSA

When you look at Tendu tree, the dark bark strikes first. That is why the species name of the tree is 'melanoxylon' (remember the melanin pigment that gives dark skin?). The genus name of Tendu is Diospyrous. This word has its origins in Greek - 'dios' meaining divine and 'pyros' meaning fruit, referring to the excellent green fruit of this plant.

But in our landscape the tree is unfortunately known for the other pyro (fire), where the unscientific practice of setting fire to get tender Tendu leaves for bidi, is being practised.

Back to the green fruits of tendu. Many fruits are green when they are young and unripe. This green colour is due to the presence of chlorophyll pigment in the fruit. On ripening, the chlorophyll breaks down and new pigments are produced, thus making the fruits vibrant and colourful- the way we know them.

But think of fruits of Careya arborea, several species of Ficus and even Tendu. They are all green even after ripening. Incidentally all the above trees are light demanders too. Is there a link between light demanding trees and ripe, green fruits?

Yes, says one of the fascinating hypotheses. Light demanders are trees that need more sunlight for their growth. But, does this growth come without any cost? Definitely not. More sunlight causes more respiratory losses in leaves (release of carbondioxide). And these trees are already over-burdened. With pollination, fruiting etc costing them a lot of their resources, they too would not mind some extra help.

Thus to compensate the above loss of carbon dioxide, the fruits of these trees, continue to retain the green pigments in them, contributing in photosynthesis and thus fixing more carbon dioxide.

To put it simply, these fruits continue to remain green to compensate the cost of producing them in light demanding trees. Needless to say this is a hypothesis, but why don't we start testing them in nature, by beginning to pay a little more attention?

tendu

DIOSPYROS MELANOXYLON

The ancient name of the district of Amravati, which is the headquarters of Melghat Tiger Reserve, was known as 'Umbravati'. It is said that the area was dominated by Umbar trees and hence the area was called as Umbravati and over time with some mispronounciation became Amravati.

When you look at the fruits of Umbar or Ficus glomerata (Ficus racemosa), you will understand why it is referred to as cluster fig. Strangely you will also observe that the fruits arise directly from trunks and not just branches, a phenomenon known as Cauliflory.

One explanation is that trees have evolved this to allow for fruit dispersal by animals especially bats, that climb on trunks to feed on fruits. In fact the bats swallow seeds along with fruit and the seeds passing through digestive tracts of the bats have increased the success of germination. Adding to it, the bats defecate while flying so they can virtually disperse the seeds anywhere.

Remember discussing the fig & fig wasp interaction in the section discussing Ficus virens? Recently more research are revealing interesting activity of ants around these figs too. While we know that each Ficus species is pollinated by a specific fig wasp, there are also many Non-Pollinating Fig Wasps (referred as NPFW) which use the fig fruit for laying eggs without pollinating the fig tree (they usually dont enter the fig and lay eggs from outer wall). Thats disadvantageous to the tree right?

But these Ficus trees are found to be partnering with ants to deal with this dynamics. The trees provide nesting sites for these ants which then predate on these NPFWs and keep them in control. Naturally the ants can predate on the pollinating fig wasps too. But because of the relatively rapid entry of fig pollinators into the fig fruit and exit, many of these pollinators survive the predation of ants. Now thats Chanakya strategy of trees right?

umbar

FICUS GLOMERATA

Sompadal has by far the largest leaves of any Central Indian tree. Belonging to the same family of Bignoniaceae as medshingi (Dolichandrone falcata), the flowers of Sompadal also has trumpet shaped flowers. These flowers occur in clusters and are hoisted above the crown of the tree by long hollow stalks and are unmissable.

The tree is also called as 'broken bones tree' because when the long leaf and flower bearing stalks dry and fall from the tree, their accumulation beneath the tree resembles a pile of broken bones.

When you are around this tree in the midnight you will sense a musty stink from this flower, which otherwise you dont sense during the day. In fact the flower opens at night and falls to ground well before sunrise. A short-unmissable-fragrant life for what?

All to attract the bats which pollinate this flower. And not just any bat species, but a specific short nosed bat, Cynopterus sphinx. Similar to a fig pollinated by a specific fig wasp, Sompadal also has a pollination relationship with this particular bat.

The bat visits the flower bud at night and bites its tip, thus enabling the opening of the flower. The stigma inside the flower is positioned in such a way that, only the nose of this bat can activiate it and within 10 seconds of touching of stigma by the bat's nose, the flower closes.

Have you heard of the 'Sword of Damocles'? It is an expression used to refer to a constant danger that hangs over someone. The long fruits of this tree curve downward and resemble swords in the night giving the tree name 'Damoceles tree'.

But why did we bring this up in the middle of the bat story? It is a theory that, once a flower in the cluster is pollinated by the bat, it develops into a fruit and curves downward so that it doesnot inhibit the bat from pollinating other flowers.

sompadal
OROXYLUM INDICUM

The yellow flowered Grewia tiliifolia (known locally as dhaman) can be detected by various features- Lets start from the leaf which has an European story. Dhaman was named as 'tiliifolia' by an European botanist, Martin Vahl, as its leaves reminded him of an European tree Tilia, which also had an imperfect heart shape like dhaman.

When you look at the stipules (structures at the base of leaf stalk), they are also unique in the shape of an angel's wing- broad near the base and curved. The trunk of dhaman too has a tendency to develop large bumps on maturity.

Now coming to the flower, the yellow colored floral structures you see arent the petals but the sepals of the flower. Sepals are the outermost parts of a flower which are often green and are meant to protect the reproductive structures of the flower. But in Grewia these structures are yellow coloured and infact the petals are unusually reduced in size. Now what can explain this?

Sometimes in flowers, the sepals in addition to providing physical protection, are also colorful to attract pollinators. This way the tree doesnt have to spend energy to create petals (which are the actual attractors of pollinators in other flowers). Call this the 'Plant economics' !

dhaman

GREWIA TILIIFOLIA

Take a cross section of the stem of Albizia odoratissima and you will find a blackish brown heartwood and that is why this tree is commonly referred as 'black siris'. Did you know that your favourite cup of Chai from North East is linked to this tree? Across North East, this tree is planted as a shade crop and it has been found to keep the tea gardens away from tea pests. Do you see the silky, white threads on the left? These are not a single flower but a group of flowers, and the threads are not the petals but the long stamens of these flower. These stamens are the male organs that carry pollen. But where are the petals? Look closely at the base. The green structures are the petals and could be easily missed.

basa

ALBIZIA ODORATISSIMA

The fruits (capsule) of Dolichandrone falcata curves on maturity and it looks like a sheep horn, hence it is commonly referred to as Medhshingi (Mendi-Sheep and shingi-horn in Marathi). The species name "falcate" is derived from the Latin word "falx," which means "sickle shape" indicating the curved fruit. The curved fruit capsule also remains in the tree for a long time after the seeds are split open and this is one way of identifying the tree.

The tree belongs to the family of Bignoniaceae known for its trumpet shaped tubular flowers which is found in this tree too. They mostly flower in the evening and fall off during the day, which tells a lot about the pollinators that are attracted by their flowers. Can you guess?

medsingi

DOLICHANDRONE FALCATA

If you ever tasted the fruit of this tree, you will never forget their sticky feel. True to this trait, the species is named myxa meaning mucus in Greek.

When you look at the natural range of many of the Central Indian trees you will find that they are extending from Pakistan to South East Asia. However Cordia is one of the few species whose natural range extends well into the drier West Asian region, thanks to the presence of sunken and covered stomata on leaves to prevent water loss (a character of Xerophytic plants).

Due to this and production of tasty fruits in summer, they were cultivated in the drier parts of ancient Egypt and Rome as early as 2nd century AD. Hence they are also popularly called as Assyrian plum. The fruits are equally relished in the wild. While birds and monkeys raid the trees, its a common sight to find the deers waiting below for the drop downs.

The tree is also widely grown in Myanmar for its leaves. It is said that 'No travel to Myanmar is complete without tasting the green Burmese Cheroots (Cigar of Myanmar)'.

Popularized by writers like George Orwell and Ruskin Bond during their days in Burma, history has that the cigars introduced by the foreigners in Burma were strong and heavy scented. This was disliked by the Burmese, who re-engineered the cigar with the leaves of Cordia myxa, making the cheroots lighter in taste. These cheroots also stopped burning when not smoked. One could say, Cheroots were a Burmese reply to the foreigners, and they are as close to the hearts of Myanmar, as Tendu is to Central India.

risalla

CORDIA MYXA

When one looks at the flower of this tree, one notices that it is small, scentless and in a colour which is unattractive. This is not a flower a butterfly or a bee might prefer. But the tree too doesnt care. Why? The flowers of this tree are pollinated by wind and so why waste energy in creating bright, attractive flowers?

The next time you see such wind pollinated flowers, observe the stamens which are generally long and slender so that pollen can be shaken off by slight breeze.

Also in such flowers, the stigmas are large and feathery, offering a large surface area to catch the dispersing pollen.

But still there is a mystery. This tree has male flowers and bisexual flowers, but no separate female flowers. What might explain this botanical patriarchy?

chirhol

HOLOPTELEA INTEGRIFOLIA

While moving through the forests of Melghat, you will notice that the understorey has a lot of regeneration of doodhi tree. This is because the tree is a shade demander, coppices well and is non-palatable.

Wrightia tinctoria is commonly known as 'doodhi' due to the white blossoms it bears when the spring starts. The flower bears a cone structure which is actually the stamens(male reproductive organ).

The Pollen and the ovaries are hidden inside this cone. So, if the pollen is hidden how will pollination happen?

The insects suck nectar from the base of the cone using proboscis(tubular mouth part) and in the process, their proboscis gets stuck. So they try to pull out and inevitably shake the flower. As a result, the pollen inside the cone, falls on the stigma, and self pollinates the flower.

Isnt it interesting that nature has evolved a mechanism for self pollination, when most other flowers prefer cross pollination for genetic diversity? Doodhi might have evolved this mechanism to protect its pollen from drying in arid areas, in which it usually occurs.

Speaking of arid areas, you might have heard about Sangam literature. In that, the land of Tamilnadu was grouped into 5 classes based on local ecology with each represented by a plant.

One of the classification is 'Paalai' (which characterizes arid areas and the emotion of separation) and it was the doodhi tree which symbolised it. When a poet chooses to use a tree to symbolize the human emotion of separation, surely there must have been a trait in doodhi that captured his/her imagination, dont you think?

doodhi
WRIGHTIA TINCTORIA

When many of the Central Indian trees are returning to plain green in late monsoon after their flowers have gone, Baranga bursts with its white blossoms.The flowers of this tree occur in two varieties- pure white and a white with a scarlet red tinge.

The calyx along with bracts (green structure holding the petals) continues to remain on the flower, even after the flower becomes a fruit. These structures look like flowers themselves even after they dry (The ones you see on the left arent the flowers but fruits).

Infact the species name 'calycina' refers to this persistent calyx that remains attached to the fruit.

The tree can be identified by looking for glands on the veins on the underside of leaf. You will also observe the cotton like leaf in this tree, as it belongs to the same family as cotton- Malvaceae. Try breaking its twigs, you might find some difficulty as like many of the Malvaceae species, Baranga is also rich in fibres and is extracted from forests mainly for the same.

The tree is quick growing and it grows so rapidly that in Teak plantations or even Eucalyptus plantations, Baranga outcompete these trees. While we are busy planting exotics like Gulmohar, why dont we start looking at fast growing, native species like Baranga to make our living spaces beautiful?

baranga

KYDIA CALYCINA

Buchanania cochinchinensis commonly known as Charoli is known for the nuts obtained from its fruit. Though commonly called as nuts, botanically a nut is a fruit that has a hard outer coat. The fruits of Charoli is a 'drupe' with a fleshy outer part and a hard inner part, like the mango. That is why the tree is placed in the same family as Mango - Anacardiaceae. Like mango, the tree is also nearly evergreen all throughout the year.

According to Buddhist chronicles Lord Budha spent a week meditating under Buchanania cochinchinensis where he uttered his first words of Dharma. Such cultural references do help us understand the historical distribution of the tree in different parts of the country, but also makes us think why that tree was chosen?

charoli

BUCHANANIA COCHINCHINENSIS

Known as Corky coral, Hadua is known for its thick corky bark with deep fissures. Look closely and you will also find prickly structures and the choice of the word 'prickles' is not random.

Remember the thorns in the barks of Bombax ceiba or Bridelia retusa? Those thorns are pointed structures which arise only from stem and consist of vascular tissues that conduct food and water. But prickles are structures that arise from epidermis (surface layer of a plant) and hence can be found anywhere in the tree including stem. Then why not call it thorn? The distinction is prickles donot have these vascular tissues. These prickles are the same you find in a rose plant too.

But one remembers Hadua for its fire-red flowers. And like a fire flame, Hadua begins to flower from bottom to top. This arrangement of old flowers at base and young flowers growing at top is known as raceme infloresence.

Such arrangements are often preferred by bees because, in such a raceme, flowers often mature in a gradient over a period of time. This gives pollinators access to nectar and pollen over long periods. But are the trees this charitable? Definitely not.

This arrangement benefits the tree too. The older flowers at the base may already have received pollen from other plants and fertilized, thus reducing the chance of self-pollination within the bunch. As pollinators move up the raceme to visit younger flowers, they are more likely to deposit pollen from other plants, as the older flowers at the bottom have already been pollinated.

So the lesson? Never walk past a tree, without knowing the magic in every inch of it.

hadua

ERYTHRINA SUBEROSA

Dalbergia paniculata, locally known as dhobin, tends to grow straight and tall to overtop competitiors for sunlight. You can spot dhobin easily by its pale bark with some faint horizontal lines. Sometimes these paler barks appear even more paler with irregular spots and these are due to white lichen which have an affinity for dhobin.

But somehow wood industry doesnt have similar affinities. Ever heard of rosewood? Many timbers of the genus Dalbergia is sold by the general name rosewood and are highly valuable. But Dalbergia paniculata timber is an exception and the timber is commercially useless.

Then what makes a good timber? Generally the stem of a tree has tissues carrying food (phloem) on the outer layer and tissues carrying water (xylem) as the inner layer. It is this xylem which is hard and what we call as wood.

Now take dhobin. Unlike other trees, in dhobin the xylem and phloem are arranged in concentric layers- so the hard layers of xylem are alternated by soft layers of phloem. This makes the wood of dhobin unstable and the layers disintegrate easily making the timber unworkable.

For this reason, the tree was decimated from the forest in the past, as Britishers used to mark and fell this tree reasoning that it is an 'unsuitable wood'. But is good wood the only criteria to decide if a tree should be alive?

dhobin

DALBERGIA PANICULATA

Fleecy - that's what Mallotus means, thanks to the hairs on its fruit coat. The tiny hairs contain special pigment that gives a mesmerizing red dye. That's why locals lovingly call it Kumkum tree. The tree also has extra floral nectaries which attracts ants, a mechanism to keep the tree away from herbivorous insects. But here is a question. People call it the "monkey face tree", Is it because of the reddish colour like a macaque's face or is it because the ant bites make your face like one? Keep wondering!

kumkum

MALLOTUS PHILIPPENSIS

Holarrhena antidysentrica (known for its treatment of dysentery) is also known as Holarhaena pubescens. The species name "pubescens" is derived from the Latin word "pubescere," which means "to become hairy". In this tree, these hairs are present in the leaves.

This layer of fine hairs can trap a thin layer of air close to the leaf surface. This air layer acts as a barrier slowing down the movement of water vapor from the plant's tissues to the atmosphere, thus reducing water loss. This adaptation is particularly beneficial in arid environments where water conservation is crucial.

The tree belongs to the family of Apocynaceae which has an interesting story to it too. The word Apocynaceae is derived from the Greek word Apocynum meaning dog-away, as some flowers of this taxa were used as dog poison.

Holarhaena belongs to the same family to which Doodhi (Wrightia tinctoria) also belongs. Doodhi is very prominent in our region, and with the white flowers and fruits (pods), one might be confused between Holarrhena and Doodhi. But when you closely observe the pods of the two trees you notice a difference.

The pods of Holarrhena are paired with only one end (apex) attached unlike doodhi where both ends are attached.

You will find Holarrhena often in understoreys and guess how it receives sunlight? Understorey trees are often characterised by relatively large leaves, which help them to grab whatever little sunlight that falls on the forest floor.

samoka

HOLARRHENA PUBESCENS

Glochidion heyneanum locally known as koria occurs at higher elevations above 600m. When you look at its fruits (see left) you will understand why it is also known as Velvetty melon featherfoil.

Have you heard of the Fig- Wasp relationship? Koria shares a similar yet unique relationship with Leaf-flower moth- One cannot reproduce without the other. Leaf-flower moth carries pollen from the male flower and deposits on the female flower, thus pollinating it. Meanwhile the moth also lays its eggs inside the females ovaries. The emerging larvae feed on the seeds and exit the fruit and it does leave sufficient seeds for propagation.

See the flowers of Koria.The male and female flowers look starkly different in size. We have seen differences in male and female individuals in birds like peacock or animals like Sambhar. But have you observed this in trees? Naturally this difference in plants is lesser than that in animals as why would plants have to create sexual differences, when they have other ways to reproduce like vegetative propagation? Still many flowering plants have this in them.

Generally speaking, in animal pollinated flowers male flowers are larger than females as the males carrying pollen have to be large and showy to attract pollinators. But in wind pollinated flowers? Its the other way around. Here the female flowers are larger than male flowers, so that they will be able to capture more pollens from the wind. Of course there are also many exceptions to this in the plant kingdom. But why dont we start from Koria to see what explains their large, male flowers?

koria

GLOCHIDION HEYNEANUM

If you spot Kari in an area, one thing you can be sure of is, the area is not prone to fire. This is because the tree is quick to disappear in areas frequented by fire and thus is an indicator of fire disturbance.

But how to be sure that the tree you spotted is Kari? Look at the bark and see if there are 'X' shaped patterns which is a unique feature of this tree.You can also crush the leaf and sniff to feel a unique fragrance from it.

Kari belongs to the same family as custard apple - Annonaceae and you can detect this family by looking at their flowers. These flowers usually have petals in two concentric circles- smaller petals in outer circle and larger petals in the inner circle with impressed veins running in the middle of these petals. But in Kari the outer circle petals are very tiny and hardly noticed.

The flowers are extensively pollinated by butterflies and is also a larval host plant for many butterflies like Common Jays and Sword tail butterflies. Next time you walk past a Kari, see if you can find some butterfly caterpillars munching on the leaves!

kari

MILIUSA TOMENTOSA

Trees of Acacia genus are generally difficult to identify as they look similar but not Acacia catechu. Locally known as Khair, it has 25 leaflet pairs in a leaf which is higher than any other Acacia species found in our region.

Trees of Acacia genus have spines on them which are modified leaves (not to confuse with thorns which are modified stems). In fact the genus name 'acacia' comes from Greek word 'akis' meaning a pointed end indicating the spines. In Khair, these spines are paired and hooked which is another sure way to identify Acacia catechu.

Also, many birds choose to nest in Acacia trees due to the inherent protection provided by the spines. There is a hypothesis that when we find crows nesting in Acacia trees, it might indicate poor rainfall during the upcoming monsoon. Can you guess why?

khair

ACACIA CATECHU

'As you let your first raindrops fall, all of nature will conspire to guide your way — Bees will swarm to the pale auburn filaments of half-blown kadamb flowers, And deer will gather along marshy banks to eat the first buds of banana tree blossoms' and so goes Kalidasa in his Meghadutam.

Kalidasa's Kadamb (Mitragyna parviflora), flowers after the first rains in June and is known for its fragrant flowers.

The ball shaped structure (see the left picture) isnt a single flower but a cluster of flowers and this arrangement is known as Head inflorescence. This compact arrangement of several flowers in a small space provides a concentrated source of nectar and pollen, making it efficient for pollinators to gather resources.

From the tree's perspective too, the tightly packed structure can shield the delicate reproductive parts of the flower from wind, rain and temperature fluctuations. Surely such traits should give a plant an evolutionary advantage, right? Unsurprisingly this Head inflorescence is the most common inflorescence in the plant kingdom.

Look down at the floor below a Kadamb tree and you will find pinkish-green leaf like structures. These arent leaves but stipules which come in pairs and protect young leaves till they mature and finally wither off. One will find these stipules in coffee plant too and both belong to the same family of Rubiaceae.

With all these quirks, no wonder Kadamb captured the imagination of Kalidasa.

kadamb

MITRAGYNA PARVIFLORA

When Haldina cordifolia is cut, its wood is startlingly yellow and hence it is commonly known as haldu or turmeric wood. Haldu is among the tallest trees of Central India and it has a massive root system proportion to its size, making it very resistant to drought too.

However, its leaves are not resistant enough in the sense, they are often preyed upon by defoliating insects.

The species name cordifolia tells us that the leaf of this tree is heart shaped (cordia meaning heart in latin). Often mistaken for Kadamb tree due to similar flowers, the heart shaped leaves are definitely a give away!

But have you ever wondered why the leaves of most plants are elliptical or heart shaped? Why isnt it in the shape of a square or a triangle?

While you keep thinking about it, the seeds of haldu are very tiny, with one gram of seeds containing as many as 11000 seeds. Expectedly, these minute seeds make regeneration very difficult for this tree, as the seeds are washed away easily. So the next time you see a Haldu sapling in the forest, remember you have a reason to smile!

haldu

HALDINA CORDIFOLIA

Ziziphus mauritiana (locally known as Ber) is the largest Ber of the three Ber varieties occuring in this region. It is a hardy tree that can withstand extreme temperatures. You can figure out this by looking at the leaf which has a pair of spines (one straight and one hooked). These are the modifications of leaf to reduce water loss.

The flowers of Ber are protandrous, similar to Teak (Refer to the discussion in Tectona grandis).

Of course people remember Ber for its tasty fruits. The tree has been cultivated (domesticated) by humans for more than 3000 years which means one can never be sure which of the trees we see are cultivated or actually wild. However, speaking of domestication, there is an interesting question that comes up.

Going through the book, one would have realised how plants have evolved different structures to induce (in fact manipulate) bees and other pollinators to further their reproduction and survival.

But when you ask a bee, may be it thinks it collects pollen or nectar because it chooses to. In the same way, when we think of human beings domesticating plants, are we not in the same position as bees?

It is true that we choose the traits of our choice in plants, for domestication. But from the perspective of a plant, has it also not induced humans (through sweet fruits and beautiful flowers) to propagate itself?

ber

ZIZIPHUS MAURITIANA

The generic name Terminalia comes from Latin word ‘terminalis’ (ending), and refers to the arrangement of the leaves being clustered at the tips of the shoots. The leaves are almost evergreen as they often occur along the river banks. But when they occur away from the rivers, they shed leaves for a while in summer. For the trees alongside rivers, frequent water flows is a challenge. But this tree has a root system that spreads horizontally along the river banks, providing stability. Have you ever wondered how the seeds of these trees establish and give rise to younger plants, despite rivers continuously washing away everything? The answer is again in their roots. The buttressed and interlocking root system of this species stabilizes river banks and the sediment and gravel retained between their roots provide new substrate for the young seedlings to germinate.

arjun

TERMINALIA ARJUNA

Unlike many other trees which are being utilised by humans without felling them, Morinda pubescens faces a different fate.

Known for the 'suranji' dye obtained from its root bark, the extraction inevitably involved the uprooting of the tree in the past; This had led to its large scale decline in our forests.

The flowers of Morinda have a long flower tube. Insects called thrips reside in these tubes for breeding and feed on the plant. But these pests help in pollination too.

Predators like birds probe the flowers for these insects. While probing, the pollens get stuck to birds which are carried to other flowers .

Even more interesting are the fruits. When you look at the fruits of Morinda pubescens, you are surely to be reminded of custard apple but these are very different. Custard apple is a type of aggregate fruit, where a single flower develops into the fruit.

But in Morinda, can you see the many flowers arising from a single node? (see the picture in left). Each flower produces a small fruit which later fuse together to form a single fruit mass. Since fusion of multiple ovaries from different flowers are involved, a single fruit contain seeds with varying genetic traits.

Everytime an animal feeds and disperses a single fruit from this tree, it will be dispersing seeds of varying genetic traits at once, which not many tree species can achieve.

barthondi

MORINDA PUBESCENS

Catunaregam spinosa is deceptive. It has variable forms and only in open and sunny situations it grows into a tree-like form. As the species name suggests, the tree has a pair of spine emerging from leaf axils. When you look at the fruits of this tree, you might mistake it for a guava and hence it is also known as false guava tree.

The tree flowers before rains and have some peculiar traits. The flowers are pure white on the first day when they bloom and have unusually high fragrance. However the next day the flowers rapidly turn into yellow losing the fragrance. But why this sudden shift? Of course, turning dull and less fragrant appears as a good energy conservation strategy for a tree, as maintaining an attractive flower is highly energy consuming for it.

But how can a successful pollination be achieved in such a short time? The secret is in the flowering which happens enmasse and the tree is almost fully covered with flowers. The flowers are very fragrant and carry large amount of nectar. This in effect attracts a lot of pollinators thus achieving pollination. Short lived, but serves its purpose!

mainhar

CATUNAREGAM SPINOSA

Tinsa is a tree that prefers hilly terrain. But isnt a slopy hill difficult for a tree to remain stable?

The key is in the root suckers which this tree produces that spread and hold the soil in the slopes thus providing better stability. You can think of root suckers as the stems that originate from the underground roots which grow into new plants genetically identical to parent plant (like a clone). That is why sometimes you find a continuous patch with only this tree.

The seeds of this tree have small hairs which cling to clothing, skin or feathers ensuring a wide dispersal of this species. The seeds of this tree also have high germination rate (success of seed becoming a tree).

But the thing to look out for in this tree is its flower. If you closely observe, you can see there are three different types of petals in its flowers. A standard petal, then two wing like petals and boat shaped petals called keel petals. You can also find the male and female reproductive parts enclosed in these keel petals. These kind of flowers are called as Papilionaceous flower (butterfly like flower)

which is a characteristic of many trees in the subfamily of Faboideae to which this tree belongs.

Charles Darwin observed that such floral structures evolved due to bees. When bees land on keel petals, due to the bee's weight a mechanism is triggered by which pollens are released from keel petals and come in contact with the bee's body and effecting pollination.

Infact there are four different mechanisms involved for this pollination but we leave all of it for your exploration.

tinsa

DESMODIUM OOJEINENSE

As is the case with many wind pollinated flowers, flowers of Kusum donot have any petals. The flowers are polygamodioecious. Sounds scary? Let us unfurl it a bit.

We know trees with flowers which contain both male and female reproductive parts in the same flower; We also know trees with flowers which have either male or female part only. A tree with both these types of flowers is said to be polygamodioecious. Now imagine how much genetic diversity this brings up with these three types of flowers pollinating amongst themselves and with others!

Another interesting aspect for which Kusum is known is lac. In Central India where forests provide means of livelihood to people, lac is an important life-saver. Lac is a resinous secretion from Lac insect, used for wood polish, cosmetics etc.

This insect, to secrete the lac, needs to feed on host trees like Palas, Ber etc but it is Kusum which is considered the primary host. Because, for reasons yet not known, the resin produced on Kusum tree is the least colored.

Kusum is known scientifically as Schleichera oleosa. The species name oleosa is derived from the Latin word oleum meaning oil, as the seed kernels are rich in oil. The tree is also sometimes referred to as Schleichera trijuga, as the word 'trijuga' stands for three pairs, indicating the three pair of leaflets in Kusum leaf.

We often look at scientific names not only to understand the species but also how related the species is to other species. Tiger (Panthera tigris) and Leopard (Panthera pardus), share the same genus name because they share a lot of evolutionary commonalities despite looking very different.

But there are some species like Kusum which have only themselves, and no other in that genus (Schleichera) and botanists call this as monotypic genus. Of course it is possible that the species has unique traits that it had to be placed in a separate genus. But many a times in case of plants, species are often poorly studied that it is difficult to determine the relationships with other species and hence are placed in a separate genus.

Isnt this a worthy reason why we should start understanding trees and plants better?

kusum

SCHLEICHERA OLEOSA

The tree with its creamy bark reminds one of a ghost and hence its commonly known as the bhutyā in Marathi (meaning ghost).

The flowers of this tree smell like dung ('Stercus' in Latin) and fruits have stinging hairs ('urens' in latin), which is why the tree is named as Sterculia urens. Despite the stinging hairs, monkeys continue to raid the fruit to feed on the seeds, which ripen during the peak summer when food is a scarcity.

Looking at the leaf of this tree, an Indian farmer will surely be reminded of cotton because both these belong to the same family Malvaceae.

It often occurs in association with Salai tree (Boswellia serrata) and if you observe the areas where these trees come up, you will find that these are mostly rocky areas with poor soil cover. One more common thing is, the areas with these trees are set on fire to collect gum exuded from their barks. In all these extreme situations, the tree continues to survive, and sometimes even leafless.

Without leaves how does the tree produce the food then? No worries. This tree has a layer of chlorophyll even under the skin of its trunk!

kulu
STERCULIA URENS

Crocodile bark tree is how one refers to Terminalia elliptica due to the scaly bark resembling crocodiles skin. Remove the bark and you will find a reddish wooden portion that is also characteristic of this tree.

The fruits of this tree look similar to those of Terminalia arjuna but there are some differences. The fruits of T. elliptica are winged and papery with straight marks while those of T. arjuna are woody with lines curved upwards.

It is one of the last trees to shed leaves in the dry season.

Speaking of leaf, turn the leaf of Terminalia elliptica and you can observe a pair of gland like structures. These are known as the Extra Floral Nectaries (EFN), developed in non floral parts like leaves.

While nectaries in flowers help in pollination, the nectaries in leaf often have a defensive function. The nectar attracts predatory insects which will eat both the nectar and any plant-eating insects around, thus functioning as 'bodyguards'.

When you are around this tree in the summer and you are thirsty, try making a V shaped cut in the stem and you will get access to 4-6 litres of water. But the interesting thing to note is the water is not stored in the fissures in the bark but is being pumped by the tree from the ground, upto a height of 25-30 feet. And only 5-10% of individuals provide such water and not all trees of this species.

So the next time you find such a tree, start searching for clues around. Who knows, You might be the first to explain this phenomenon.

saja

TERMINALIA ELLIPTICA

Lets begin to understand Jamun by crushing its leaves. Can you feel the aromatic smell? You might have got a similar feeling from the leaves of Eucalyptus too. This is because both these trees belong to the same family of Myrtaceae. The leaves in the trees of this family are often evergreen and Jamun too shares this trait. One often finds a patch of evergreen Jamun along riverine tracts.

On close inspection of this tree, one will notice some leaves of Jamun are rolled. Unfurl them, and you will be surprised.

These are the handiwork of moth caterpillars, who roll the leaves to form a shelter and happily munch on the leaves from inside. Some young leaves can also be seen webbed together. This is also the work of moth caterpillars to create a shelter for feeding.

Thats enough of leaves. In Central Indian forests, one comes across flowers with bright petals (as in Palash) or flowers without petals (as in Saja). But in Jamun, the flowers do produce petals at the bud stage but later fall off when the flower opens. Now why would a tree invest its energy in creating these petals?

If that wasnt surprising enough, think about this. In the ancient Indian civilization, the whole world was divided into seven Islands with Jambudvipa at its centre. Of course there are geographical inaccuracies in such a description but isnt the naming curious? To name such a biodiverse Indian land mass as Jambudvipa, meaning the island of Jambu (Jamun) trees?

jamun
SYZYGIUM CUMINI

Wet or swampy areas are generally referred as uliginous. Because Katul grows in such areas, the species name of this tree is 'uliginosa'.

While Tamilnadia is the genus name of this tree, sometimes the tree is also referred as Gardenia uliginosa. Gardenia is a genus in the coffee family (Rubiaceae) known for their fragrant,tubular white flowers which is a characteristic of Katul too.

Interestingly the flowers of Katul also have dense white hairs guarding the mouth of the petal tube. If you closely observe its flowers, you will find something more interesting. Traditionally in flowers the pollens are held by a elongated structure (filament). But Tamilnadia uliginosa is a rare exception where these elongated filaments are absent.

What about the pollen then? The structure looking like spokes of a wheel in the flower here(picture on left) is actually the anthers(which contain pollen) lying flat on the petals. Hairs guarding the mouth of petal tube and an unusual spokes like anther- Can you guess, what could be going on in this flower?

katul

TAMILNADIA ULIGINOSA

While the three bers occuring in our region look very similar to each other, to identify Ziziphus xylopyrus, one has to look for a prominent ring on the fruit, where the stalk meets the fruit. Unlike the other bers, the fruits of this tree are hard and woody and hence the tree is described with the species name of 'xylopyrus' (meaning wood like fruit). Not just the fruit,the timber of Ziziphus xylopyrus is also very hard and can create fire by friction. The three bers found in our region have spines in their leaf axils. Ziziphus xylopyrus also has a pair of spine - one straight and one curved. But sometimes Ziziphus xylopyrus also occurs without spine and is known as 'makna' (the same word used to describe an elephant without a tusk). As spines are a modification to keep off animals and also as an effort to reduce water loss, wonder what would explain the makna trees?

katber

ZIZIPHUS XYLOPYRUS

When one looks at Lendia (Lagerstroemia parviflora), one cannot miss the intensely flaky bark which is a characteristic trait of the family Lythraceae to which the tree belongs to.

Flaky barks are often a defense mechanism as, shedding the outer bark layer can help remove or limit the presence of pests that may be harboring under the bark. Even in fire prone areas flaky outer bark layer may burn off, so that the live tissues underneath can survive, allowing the tree to regenerate after a fire.

The family of this tree also has a special feature of heterostyly- meaning within a population, there are different variations in the flower.

One flower in a tree will have longer stamens(male organs) and shorter pistils(female organs) while a flower in another tree will have shorter stamens and longer pistils. These variations in flower occur between trees and not within a tree. So? Imagine a flower with nectary glands in its centre. The flower has a short stamen near the nectary gland (at bottom) and a long pistil (at a certain height) from the nectary gland.

Now when a small insect tries to feed the nectar at the bottom, the pollen from the stamen will get attached to the insect body due to proximity. Because of the smaller size of insect, the attached pollen will not come in contact with the longer pistil in the same flower.

Now when the same insect, moves to a flower with shorter pistil and a longer stamen to feed on the nectar, the reverse happens. The body of the insect comes in contact with the shorter pistil at the bottom, thus completing pollination.

A similar mechanism occurs in case of larger insects, where their body comes in contact with the flowers with longer stamens and longer pistils. This way cross pollination is ensured in the trees of this family. Now this is a common trait in this family, but dont you wish to check if the same is true in Lendia?

lendia

LAGERSTROEMIA PARVIFLORA

The species name 'latifolia' of this tree indicates the broad leaves. The tree is also commonly known as axle wood as in earlier times, the axle of wheels were made from the wood of this tree. When you observe the flowers of this tree, you will notice that there are no petals. But the flowers are pollinated by insects. Isnt this strange, when we were taught that petals attract insects?

When you look at the fruits, you will find winged structures, which is an indication that the seeds are dispersed by wind. However the seeds of this tree have poor germination rate, meaning the number of seeds falling on the ground that grow into a sapling is very less.

Look at Dhavda and you can see that the bark flakes off in round scales unlike say a Teak or Lendia. We know that that shedding bark might make a tree resistant to fire or insects, but why do different trees shed bark in different shapes and ways?

dhavda
ANOGEISSUS LATIFOLIA

With many species of Terminalia in our region, the first difference you notice right away with Terminalia chebula is that the fruits of this tree are not winged.

Terminalia chebula commonly known as hirda, prefers cooler areas of high plateaus (1000m or more).

As discussed in Terminalia elliptica, extra floral nectaries are present in this species too but it is present on the upper side of leaf unlike T. arjuna or T. elliptica, where it is present on the lower side of the leaf (Wonder why?).

In Tibet, this tree is considered as the 'King of Medicine' and the 'Medicine Buddha' in Tibetan sacred paintings holds this plant. In India too, the species is familiar as one of the three ingredient of Ayurvedic 'Triphala' (with other two being Terminalia bellerica or Baheda, and Emblica officinalis or Amla).

But is same hirda being used everywhere? In Ayurveda, Seven different hirda fruits are recognized (vijaya, rohini, putana, amrita, abhaya, jivanti, and chetaki),based on the geographical regions in which it grows, as well as the colour and shape of the fruit.

Generally the vijaya variety is preferred, which is found in the Vindhya Range of west-central India.

Now imagine, to decide that Hirda growing in Vindhya range is better than the others, one must have an understanding of the distribution of the tree across its range (South Asia and South East Asia), one must know the different morphological variations in the fruits and also its phyto chemical composition. Surely without a curiosity for these trees, could one have arrived at this medicinal wonder?

hirda

TERMINALIA CHEBULA

Of the trees occuring in Melghat, Tetu could be one of the very few, if not the only tree having a range restricted to Indian subcontinent. This in itself is curious, as many other trees found in Central India have their distribution extending well into South East Asia.

The species name of Tetu is xylocarpa referring to its woody fruit ('xylon' meaning wood and 'karpos' meaning fruit in Greek).

In terms of leaves, Tetu has enormous leaves with several pairs of leaflets and one would think, it needs a strong leaf stalk to support all this. So how Tetu does this?

Closely observe the woody parts of leaf stalk and you will find pores on them. These are called the lenticels which evolved in plants to improve gas exchange. Many a times, because woody structures are impermeable, gas accumulation happens under the wood thus affecting its strength. The presence of lenticels prevents this by allowing gases to move in and out, providing strength to the parts on which they occur.

Belonging to Jacaranda family (Bignoniaceae), Tetu strikes us with its white, tubular flowers. The flowers pollinated by bats often have a stinking smell. But Tetu could be one of those rare trees pollinated by bats that has a pleasant smell for humans.

But because the flowers are tubular, it is also observed that sunbirds directly slit the flower tubes side ways and rob the nectar without contributing to any pollination. Isnt this nectar robbery disadvantageous to the plant?

No, nothing in nature remains without a reason. In the case of Tetu, the interesting explanation is, as the birds rob the flowers of nectars, other pollinators are forced to move across many flowers to obtain nectar, which leads to increase in pollination rate. This ends up benefitting the tree despite the small nectar robbery. Because of all these interesting traits, no wonder the people of Melghat have a village named after Tetu tree.

tetu

RADERMACHERA XYLOCARPA

Fruits of Semecarpus anacardium reminds one of cashew and the fruit has many interesting stories. The fruit, green at first matures into a shiny black fruit, which was crushed and used as marking ink by washermen in India, in the past. Hence the fruit was commonly known as marking nut tree.

Infact the word Semecarpus is derived from Greek word 'simeion' meaning marking or tracing and 'carpus' meaning nut, giving the tree its name.

The juice from the fruit when applied on skin creates blisters, and it is jokingly said that many students used it to create injuries on their skins, to escape school. Such juice exudes, even when the bark is cut and causes blisters. Hence the wood is also not used much.

The fruit is divided into two parts- the top edible false fruit(because it is formed from non reproductive part of flower) and the bottom toxic true fruit (with seed), which is formed from the female reproductive parts of the flower.

One might wonder when many flowering trees have seeds inside an edible fruit, why would this tree have a separate edible fleshy part in addition to a toxic fruit with seeds?

Toxic fruits could have evolved to protect seeds from being damaged by other animals and birds. But wait. Who will disperse the seed then, if they are not eaten? Maybe, that is why there is an edible false fruit at the top to keep the birds busy eating, while the tree succeeds in dispersing its next generation.

dhobinut

SEMECARPUS ANACARDIUM

A tree with its flowers bursting like Diwali sparklers from the ends of twigs! That is how one remembers mohin in the summers of Central India.

When one starts observing the flowers of mohin, one starts seeing the differences in the male and female flowers. The male flower clusters are long, more dense and branched. This is in contrast to the female flower clusters which are short and unbranched (The picture on the left).

Interestingly in mohin, both male and female flowers occur in separate trees, and such species are referred as dioecious.

This is important because when we plant such trees for afforestation, we need to plant both these types. In avenue plantation, however, the tree is not a favourite because it remains leafless until May (when the sun is still scorching).

In terms of timber, male trees are generally preferred. This could be because in female trees, most energy is utilized by the tree in reproductive growth (fruits), leaving less energy for growing timber. However in male trees, fruits are not produced and hence most of the energy is allocated to vegetative growth which includes the timber too.

Now one might easily spot the male and female mohin. But one should also start wondering, why are the male flower clusters branched, while the female flowers arent? Is it something to do with the pollination? Visit Mohin this summer and see for yourself.

mohin

LANNEA COROMANDELICA

The whorly arrangement of the branches on the stem, make girchi look like a hat stand.

Girchi fruits during rainy season and the seeds are viable for a very short period only. This trait is shared by other species too, that fruit during the rains. One possibility could be that these plants need not spend energy to create long viable seeds, as the conditions are already favourable for germination in the rains.

The flowers of girchi are interesting. They have 6-8 stamens (male reproductive part) and few thin staminodes. Staminodes? These are the sterlie stamens that do not produce pollen. Then why would a flower have such a structure?

Present hypothesis is that these staminodes perform different functions in different flowers- They might be the source of nectar in some flowers; They might be a structural barrier between the male and female reproductive part in other flowers, to prevent self pollination or they might even produce the smell for attracting pollinators.

Interestingly the species name of girchi is graveolens (referring to the strong, offensive smell from the flowers). Are the staminodes in girchi behind this? Go out and check.

girchi
CASEARIA GRAVEOLENS

The tree is known by its common name 'Kumbhi', because the fruits with their hollow top gives the appearance of a water pot. In fact in tamil, the tree is referred as 'putta tanni maram' (water bark tree) as there are exudations from the bark in dry weather. Wild pigs are very fond of the bark, and these are used by hunters to attract and trap them. The flowers of Kumbhi open at night and bats are their favourite pollinators. The flowers are showy, having copious nectar with a musty smell and also appear on leafless tree making it easier for the bats to echolocate and approach. But why should the tree spend so much energy for creating such large flowers and huge nectar, instead of creating a small flower to attract insects and achieve pollination? For all the efforts of Kumbhi, the bats pay back by carrying large amount of pollen, thus ensuring that enough pollens are available for fertilisation of the flower they visit next.

kumbhi

CAREYA ARBOREA

When you look at the leaf of Aegle marmelos against sulight, you will see small, circular glands across the leaf. These are citrus glands which are the characteristic feature of the trees belonging to the family Rutaceae (Orange family). The flowers of this tree are extensively pollinated by Spotted red beetle and when the flowers mature into fruits, they ripen into a orange-yellow colour justifying its popular name "Golden apple". Many a times, you will see langurs, sloth bears and wild boars breaking apart the hard shell of these fruits to have a sweet meal and yes, they are the ones dispersing the seeds across our forests. The fruit is not just a sweet delight for these animals but also a reliable source of food for many others, as the tree survives conditions where even other fruit trees fail.

bael

AEGLE MARMELOS

When you scratch the bark of the mahua tree, you will see white latex exuding from it which is a characteristic trait of the Sapotaceae family to which mahua belongs.The milky latex is a mechanism to prevent herbivores and insects from feeding on the young plants.

Also, when any injury is caused to the plant, milky latex will seal the opening thus keeping the pathogens away.

The flowers of this tree are short lived- they bloom at night, and at dawn the flower falls to the ground. Have you noticed the huge fragrance from mahua flower? It is due to this night-blooming feature that the flower has to be more fragrant to attract pollinators even at night. Also, flowering at night reduces competition with other trees. Imagine how difficult it would be to compete with flowers from various trees, that are trying to woo pollinators in the daytime.

We cant leave Mahua without speaking about the liquor it is famous for. When there are so many flowers in the wild, have you ever wondered why liquors are made from mahua flower? The answer is the sugar. Liquors are produced by fermenting sugar and distilling it, and the mahua flower has one of the highest sugar content (70% of the flower weight). No wonder, humans found a way to taste this flower.

mahua

MADHUCA LONGIFOLIA

The greatest compliment that can be given to a botanist is to have a plant named in their honor. But what if there are two botanists who are brothers? Simple. Give their name to a tree with twin lobed leaf.

That is how Bauhinia got its name, honouring the botanist brothers- Jean Bauhin and Gaspard Bauhin. The flowers of this particular Bauhinia tree (locally known as Keolar) are purple in colour, which explains its species name purpurea. The tree is also synonymously referred as Bauhinia triandra referring to the three fertile stamens (male reproductive part) in the flower.

There are few other Bauhinias in our landscape too (B. racemosa and B. variegata), but you can identify Kachnar from the fact that its leaf lobes are more pointy than other jungle Bauhinias.

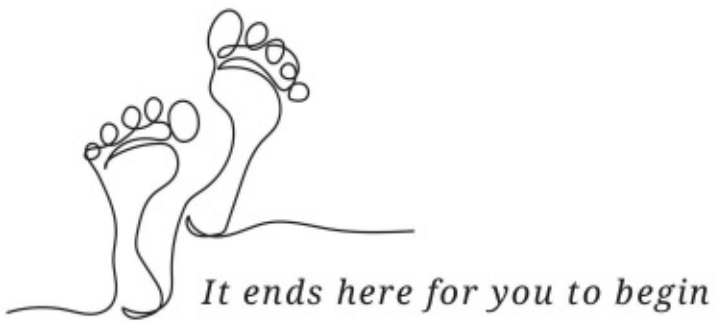
In terms of flowers, those of B. purpurea look similar to B. variegata from a distance, but herein too there are few differences. The petals of Bauhinia variegata are broad and overlap. But when you observe the petals of Keolar, they are narrower and do not overlap.

These two different species however share a fascinating story. These two trees are capable of xenogamy (meaning pollen from one species can fetilize the ovary of another species). This is the equivalent of a tiger mating with lion to produce a liger. It has been found that the hybrid that is resulting out of such a xenogamy between these trees is Bauhinia blakeana, whose flower you find in the national flag of Hong Kong. But what favours such a xenogamous phenomenon?

One, both the trees flower at the same time. Second, both share the same pollinators. Third, the stigma (female part) contiues to be receptive, even after the anther (male part) dries. This allows for pollen from other Bauhinia species to pollinate the stigma. Fourth, there is also a spatial separation of stigma and anther which reduces chances of self pollination thus allowing for xenogamy to take place. All these conditions exist in our landscape too, but do we have this hybrid in Melghat?

keolar

BAUHINIA PURPUREA


It ends here for you to begin

Flowers are rarely noticed in trees. And the summers in Central Indian forests are dismissed as dry and boring. We wish to bring focus to them both. In summers most trees bloom and that is when life is at peak in these jungles. Pollination, dispersal and a whole world of fascination awaits in these trees in 'boring summers'.

DIVYA BHARATHI

Imagine a life where, what everyone knows about you is just your name. That is the closest many of us reach to nature - knowing the name of the bird that flew past, or the tree we walked by. And all we learnt is, how adults name things and nothing else. This is a book we wrote for ourselves, to remind us of the child - to whom, everything around, is worth exploring.

JEYKUMARAN

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