JUNGLE TREES OF CENTRAL INDIA

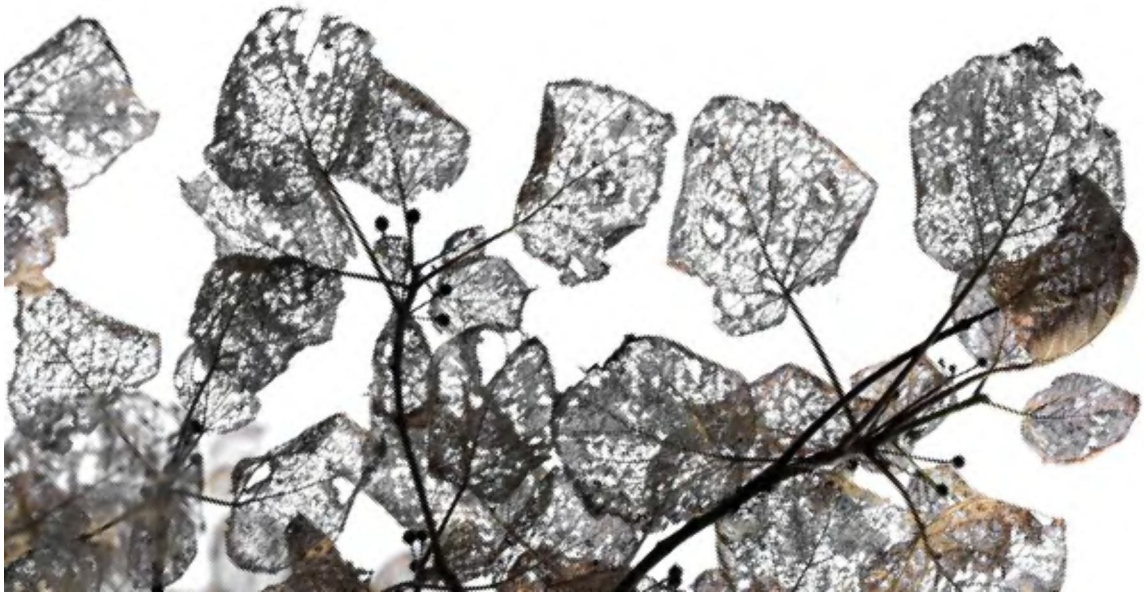
A FIELD GUIDE FOR TREE-SPOTTERS

PRADIP KRISHEN

CONTENTS

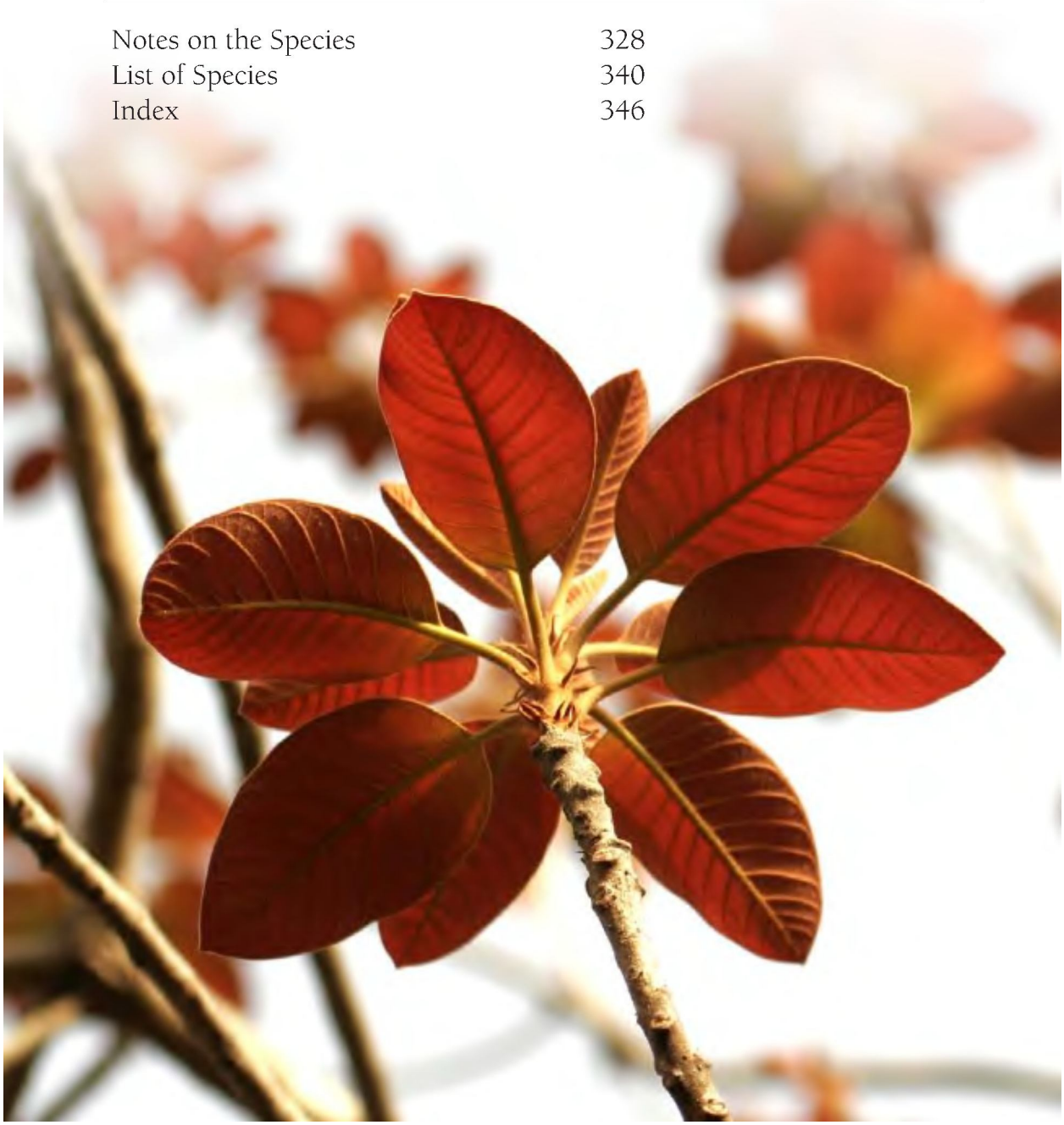
INTRODUCTION

THE KEYS



TREE GUIDE

BACK OF THE BOOK



with milky sap

no milky sap *leaves arranged in opposite pairs*

flaky bark *with thin scales lifting off*


Amla *p43*


Arjun *p56*

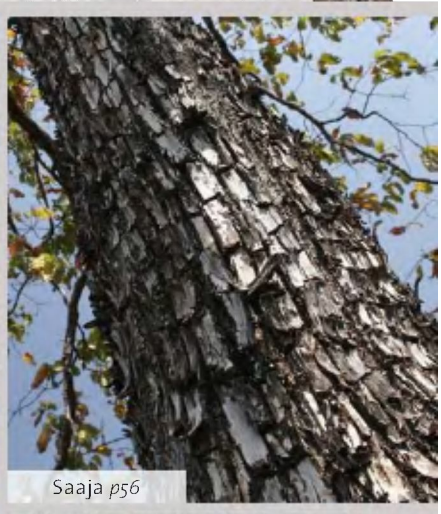

Beeja *p34*


Bhilma *p126*


Chichola *p139*


Dhavda *p211*


Bhoti dhaman *p312*


Saaja *p56*


Kulu *p124*


Kalle *p77*


Jamun *p221*


Lendia *p59*


Papda *p216*


Kasai *p274*


Sagaun *p291*

smooth bark *more or less*

scabby bark *with thick scales, not lifting off*

aam ahm

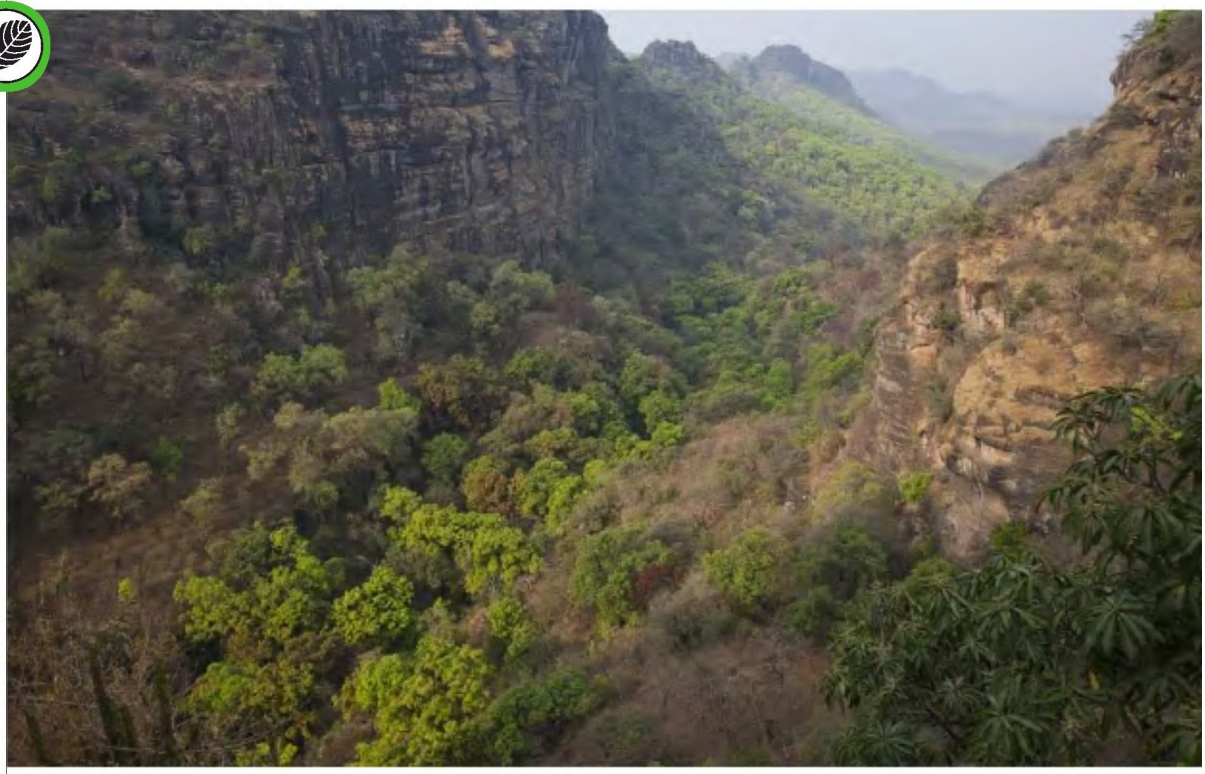
aam • amb • ambe • amri | mango

Mangifera indica

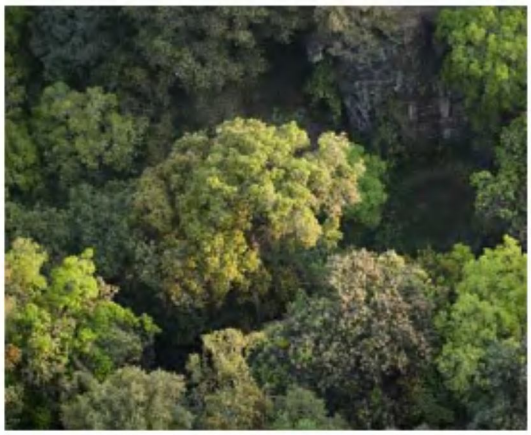
Anacardiaceae - cashew family

SEASONS : *LEAVES are usually described as 'evergreen' but flushes of new leaf happen at various times through the year. New flushes start out red or pale brown, then turn pale green before darkening. FLOWERS February to early March. FRUIT ripens June-July*

Wild mango trees grow a lot taller and wider than cultivated trees, with busy, densely branching canopies drooping low to the ground. Their leaves are noticeably slimmer and the fruits small and fibrous but are still excellent to eat. Mangoes require full sun to ripen and are produced mostly on the outside of the tree. Found through much of C India, wild mangoes show a clear preference for well-watered, well-drained sandy or gravelly soil. 'Mango galleries' closely following the course of perennial streams form a distinctive microhabitat in dry jungles. There is some doubt that the mango is truly wild in C India but it is hard to doubt the antiquity of the giant 'wolf trees' that grow along rivulets in the Mahadeo Hills, untouched by forestry operations.



A nearly pure 'mango gallery' in March, close to Pachmarhi town in the Mahadeo Hills

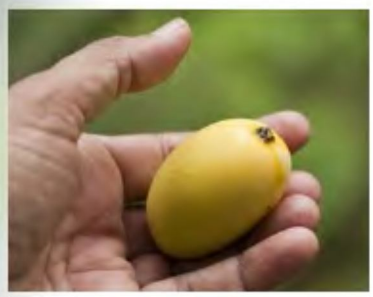


BARK greyish-brown or occasionally quite dark, rough with shallow fissures, breaking off in thick, irregular, scabby plates

LEAVES 10-30cm long, slender, dark glossy green above, paler and matte below, with a turpentine smell. New leaves droop limply at first and change from a light tan to pink and scarlet before they fill with chlorophyll and turn green.

FLOWERS tiny, in large, terminal clusters with tens of thousands of bisexual and even more numerous purely male flowers. Each flower has 4-5 ivory white petals, fading to pink. On average, less than 1 in 400 of the bisexual flowers set fruit.

RIPE MANGOES grow upto 20cm long, are somewhat kidney-shaped with a characteristic 'beak'. The waxy skin encloses a sweet or sour-sweet pulp and a hard, flattish, fibrous stone inside. Wild mangoes may be yellow or green when ripe.

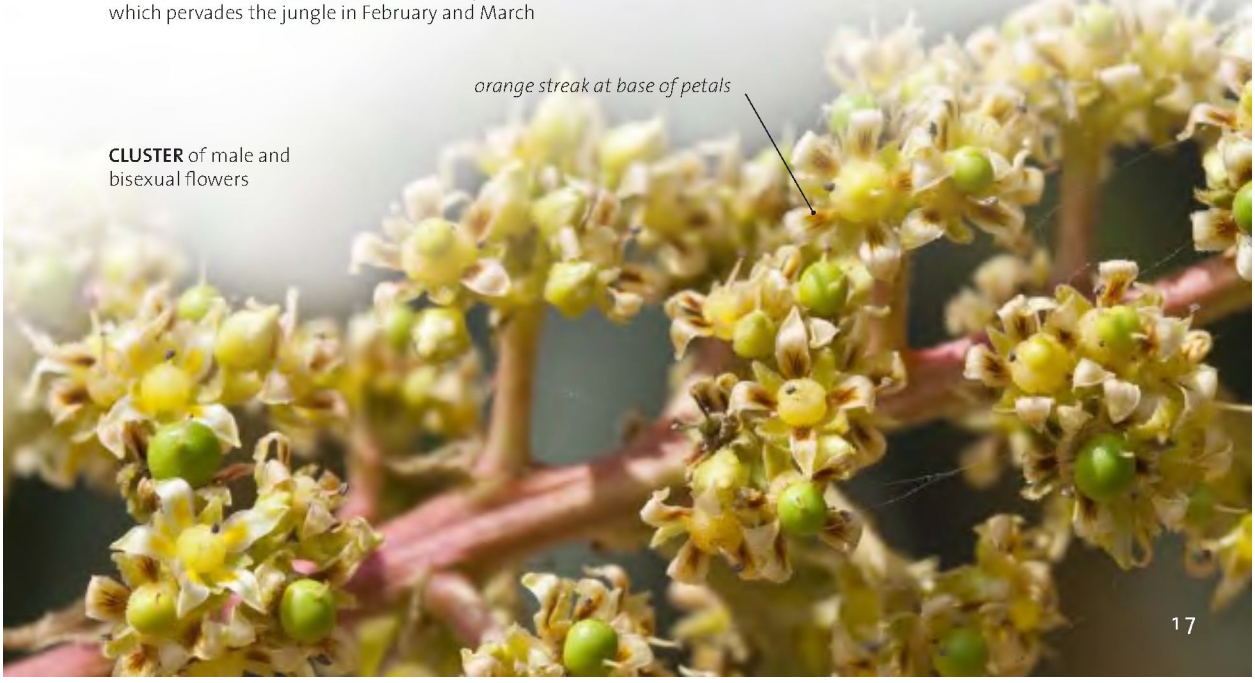


WILD MANGOES are very small

USES

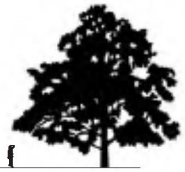
The first rains in the jungle spark off a few frenetic weeks when hill people collect ripe mangoes for sale to the pickling industry. Bears, monkeys and flying foxes compete with humans for the fruit. In traditional systems of medicine, the unripe fruit (roasted, pulverized, shredded) is credited with curing stomach ailments, heat-stroke and water retention and the gum is used as a salve for cracked feet. Mango leaf, peel and bark are known to have antioxidant properties. The leaves and flowers are used in Hindu ritual worship. Mango wood despite being soft, light, coarse-grained and difficult to season, is used for country furniture, doors, crates and implements.

MANGO flowers en masse and have a unique scent which pervades the jungle in February and March



CLUSTER of male and bisexual flowers

bhormal BHORR-mahl



bhormal • bhawarmal • bohar • biharukh • potur • pauntar • mahua kadhar | bridal couch

Hymenodictyon orixense

Rubiaceae - coffee family

SEASONS : *LEAVES turn bright yellow before falling in November. Long deciduous, leafless till May or June; new foliage deep pink-brown at first. FLOWERS in last week of July, August. FRUIT conspicuous on leafless trees from December; capsules open March-April*

A tall, handsome tree with a pyramidal crown and heavy, cantilevered limbs. Bhormal does not usually stand out in the forest except when its crown turns bright yellow just before leaf-shedding. In leafless condition you can easily spot bhormal trees by the panicles of small brown fruit capsules which remain throughout the dry season. Bhormal is found in dry, mixed forests through much of the Indian subcontinent (barring the rainforests and the arid regions in the west) and in Myanmar, Thailand and Vietnam. It is an associate of sal and seems to prefer dry, bouldery sites where the water-table lies at some depth. At the same time, it is seldom found very far from streams or seasonal nalas. In C India, it is seen only in the eastern fringe.

Bhormal near Bandhavgarh in late October, just before it sheds its leaves

The bark has characteristic corky plates set close together

The leaf-like bracts turn brown after the flowers turn into fruit

BARK dark brown, thick, with raised corky scales; diagnostic

LEAVES in opposite pairs, hairy, clustered towards ends of twigs; broad, 10-30cm long with a pointy apex and narrow base; toothed stipules conspicuous, falling early

FLOWERS tiny, greenish, crowded in dense spikes forming long drooping panicles; 5 bell-like petals; stamens very short, style long and protruding; flower spikes flanked by a pair of large leaf-like bracts, net-veined

FRUIT in long, drooping clusters of capsules, each about 2cm long, brown when ripe; the leaf-like bracts persist, turning chestnut-brown

USES

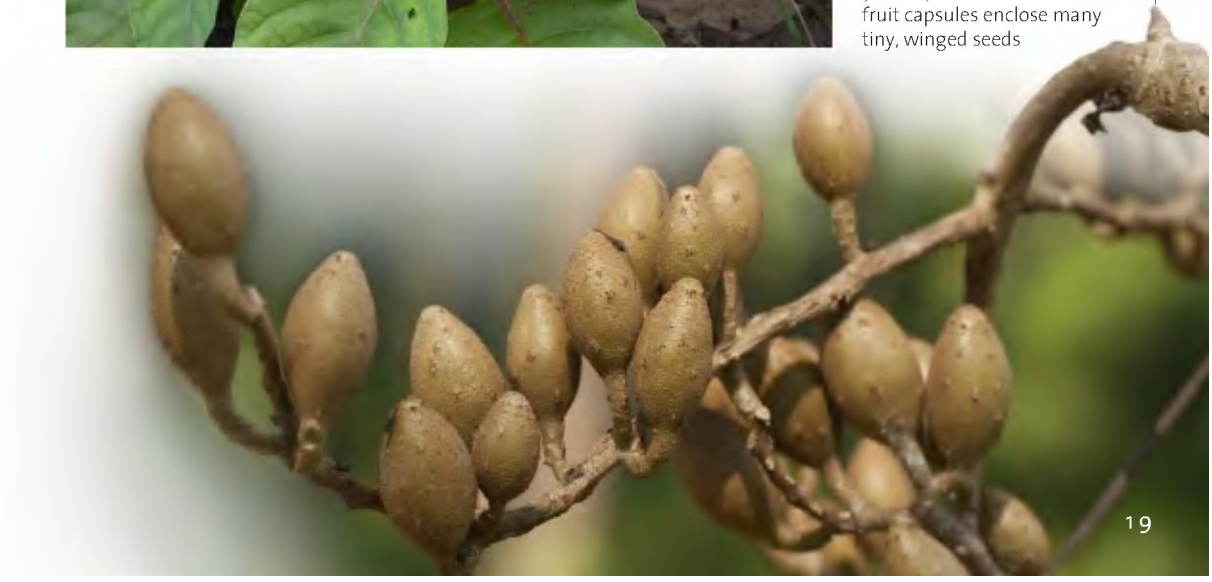
Bhormal's astringent bark is used by tanners and the inner bark and root as a febrifuge. The leaves are a cattle fodder. The pale brown wood is fine, close-grained and very light, and finds use in making box-planking, scabbards, grain measures, palanquins and toys. It takes a good polish and does not warp.

pale green stipules have a fringe of tiny, dark glandular teeth

Styles protrude far out of the flower

(RIGHT) Leaves are arranged in opposite pairs. Note the pink stalks and midribs

(BELOW) The short-stalked fruit capsules enclose many tiny, winged seeds



amla AHM-lah

amla • aonla • aunra • aongra | emblic myrobalan • emblic • Indian gooseberry • malacca-tree

Phyllanthus emblica

Phyllanthaceae – amla family

SEASONS : *LEAVES shed in late winter. New leaves in March or April usually with another flush in the rains showing as paler new growth towards the ends of the twigs. FLOWERS from late March to May, depending on locality. FRUIT ripen in winter from November to February*

An open-crowned tree with feathery grey-green leaves and a crooked trunk marked with distinctively peeling bark. Amla's tiny leaves are the smallest leaves of any jungle tree in our region and can easily be mistaken for leaflets of a compound leaf. The pale greenish-yellow or pink-tinged unisexual flowers grow in densely crowded clusters towards the ends of twigs, resembling the catkins of a willow. Amla's spectacularly sour fruit are highly valued in traditional systems of medicine. Amla trees likes savanna and open forests. They thrive on deep, loamy soil but tolerate poor, gravelly, even alkaline soils. Amla is found through most of the Indian subcontinent avoiding only the most arid tracts and ranges through SE Asia and China upto Borneo.

With its fine foliage and graceful habit, amla trees are sometimes cultivated purely for ornament

Leaves look like a pinnate compound leaf, but are actually very tiny simple leaves

Enlargement of a single leaf. Note the tiny stalk

You can usually see 6-8 pale lines which appear to divide the fruit into segments

BARK thin, grey, peeling off in papery scales to reveal orange-buff underbark; often beautifully patterned

LEAVES tiny, narrowly linear, about 15mm long, arranged closely along deciduous twigs. Base of leaf rounded, apex with a tiny point. Young leaves reddish and finely hairy, becoming smooth as they mature

FLOWERS small, unisexual, growing on naked portion of twigs below the leaves. No petals, but male flowers are short-stalked with 5-6 calyx segments resembling petals. Female flowers less numerous, usually growing above the males. They are recognized by their triple-forked styles with stalks even shorter than the males

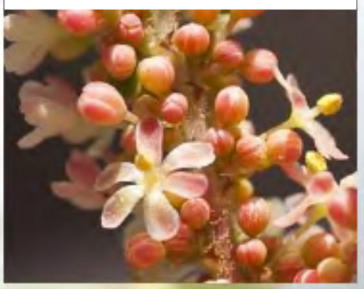
FRUIT spherical, 2-3cm in diameter, with a tight, smooth, translucent skin, greenish-yellow or sometimes pink. The crisp, succulent flesh inside the fruit is exceedingly sour. Inside lies a stone containing 6 seeds.

USES

The amla tree — and its fruit in particular — would put a well-stocked pharmacy to shame. The fruit are the richest known source of vitamin C in nature, more than 20 times more concentrated than oranges. Ayurveda relies on amla fruit to treat an amazing spectrum of complaints, especially relating to gastrointestinal problems. Along with other myrobalans, the fruit is a constituent of *Triphala* which is used to treat dysentery, biliousness, haemorrhoids and enlarged liver. The fruit is reputed to increase vitality, promote longevity and increase the power of memory. The fruit juice is used as an eye-lotion, hairdye and also to treat piles, urticaria, vomiting, and bleeding from the nose. It is also cooked, boiled and preserved as a general purpose tonic. The rootbark and bark are rich in tannins and are used to tan leather. Even the seeds are employed in various ways to treat asthma, bronchitis, diabetes and fevers. Amla timber lacks a heartwood but is dark red, beautifully mottled and durable.

THE BERRIES are pale green at first but as they begin to mature turn yellowish or occasionally dark pink

AMLA BARK is distinctive but quite variable. Here you see the most common pattern of old grey bark flaking off to reveal a pink underlayer



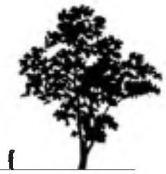
female flowers are found closer to the growing tip of the shoot. You can recognise them by their forked styles

FLOWERS of both sexes cluster near the top of leaf-bearing shoots. What seem like petals of the male flowers are actually segments of the calyx

Male flowers, with 3-5 anthers fused into a short column

kardhai kurr-DHEY-i

kardhai



Anogeissus sericea var. *sericea*
Combretaceae - arjun family
SEASONS : *LEAVES fall in February-March; new leaf in April-May, though the canopy does not become completely renewed until the end of June. FLOWERS before the leaves from late February to early April. FRUIT ripens May-July*

Kardhai are rare, beautiful trees known only from a few places in C India as well as Mt. Abu and the Panch Mahals in Gujarat. In our area they attain their largest size and magnificence in a rainy spot in the eastern Satpuras atop Pachmarhi and Dhoopgarh, more than 1,000m above msl. Here they grow to 20m or more and are worth travelling to see in March when the leafless, drooping boughs are filled with masses of tiny yellow flowers. When the small leaves do appear they are clothed at first with long, silky hairs that look like they are tipped with silver points of light. Be careful of the common name 'kardhai' because it is also used in C India for another species of *Anogeissus* (*A. pendula*) that is more widely prevalent.

FLOWERS en masse in March when the tree is completely leafless

BARK grey, rough, with darker scales making it blotchy.

LEAVES in opposite or near-opposite pairs, 2.5-6cm long with pointy apices; young leaves with long silvery hairs, retained only on the undersurface by mature leaves.

FLOWERS in densely packed 'heads' about 15mm in diameter, with many tiny, yellow flowers; no petals.

FRUIT also in dense 'heads'; individual fruit 3.5 x 5mm, winged, with the remains of the flower's calyx sticking out on all sides to form prominent 'beaks'.

USES

The leaves are lopped for fodder. Kardhai has a reputation for having one of the hardest timbers and Pachmarhi's carpenters are loathe to work it except to fashion small articles like handles and shafts for agricultural implements. No medicinal properties or folk remedies have been recorded.

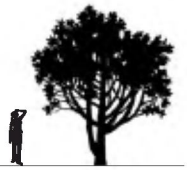
THE FRUIT look like little brown balls from a distance

YOUNG LEAVES are clothed with long silken hairs

(BELOW) A flower-head just beginning to open with the stamens unfurling (on the right)

THE FRUITING heads are made up of layers of flat fruit with their wings

thhooar THHoo-urr

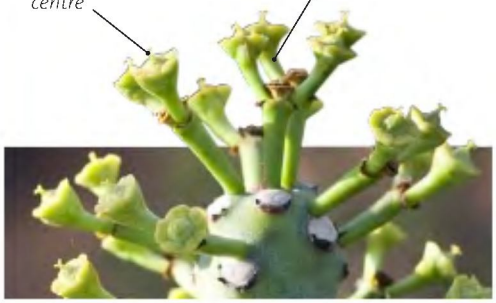


thhooar • danda-thhor • senhar | indian spurge

Euphorbia nivulia
Euphorbiaceae - poinsettia family
SEASONS : *LEAFLESS through the dry season from about January or February till just before the onset of the rains. FLOWERS in late February or March or even April in very dry localities. FRUIT rapidly follows the flowers and in most places is ripe before the middle of April*

With its succulent, spiny, cylindrical limbs, it takes no effort to mistake thhooar for a cactus. But Cactus is a purely American genus, and thhooar – along with some other Euphorbias – has beaten its own evolutionary path towards adapting to dry, rocky conditions. It can grow to 9m and then develops broad corky flanges near the base of its trunk. Its fleshy leaves grow in rosettes near the ends of branches and the tiny flowers are unusual (like other Euphorbias) in their form. Thhooar ranges through most of the Indian subcontinent. The milky latex from the fleshy tissues is toxic and is used to induce violent purging and as an antidote to snake venom. There is some modern interest in the wound-healing properties of the latex.

Without its leaves in the dry season, you can clearly see the candelabra-branching pattern of a large thhooar tree



(ABOVE) Notice the involucres in groups of three
(BELOW) The 3-cornered fruit growing out from the centre of an involucre

The succulent leaves grow in crowded rosettes towards the ends of branches

BARK thick, furrowed, corky, especially on old trees

SPINES short, straight, in pairs, arising from small corky areas on the branches

LEAVES 10-25cm long, fleshy, smooth, broad at the apex, tapering at base. Veins obscure and hardly any leafstalk to speak of

FLOWERS yellow-green, arranged in cup-like clusters ('involucres') at branch ends, with a ring of fleshy glands enclosing tiny, male (red) or female flowers. No petals or sepals. Involucres grow in groups of 3 – a short central one with a single male flower, the other 2 with a central female flower surrounded by males

FRUIT a small pink capsule shaped like a 3-cornered hat that splits explosively to release its seeds

kair kerr

kair • kareel • kareer • dhalu | bare caper

Capparis decidua
Capparidaceae - caper family
SEASONS : *LEAVES notably absent most of the time; new leaves only briefly in March or April. FLOWERS in late March, usually once more after the rains in August-September. FRUITS ripen quickly after flowering, usually in April-May and again in October-November*

You are much more likely to see kair as a low, spiny bush but in favourable conditions it does sometimes grow into a distinctive small tree with a characteristic mop of trailing green, leafless branchlets. It has beautiful flowers and fruit that are pickled, cooked as a vegetable and used medicinally. In C India, kair is found only in the western and north-western fringe where it colonises dry, exposed rocky hillsides that other plants avoid. It is much more at home in the western desert regions of India and Pakistan, stretching further west into the sandy wastes of N Africa. It owes its success in arid environments to a formidable root system that reaches deep down in search of moisture. It is equally at home in rock and deep sand.

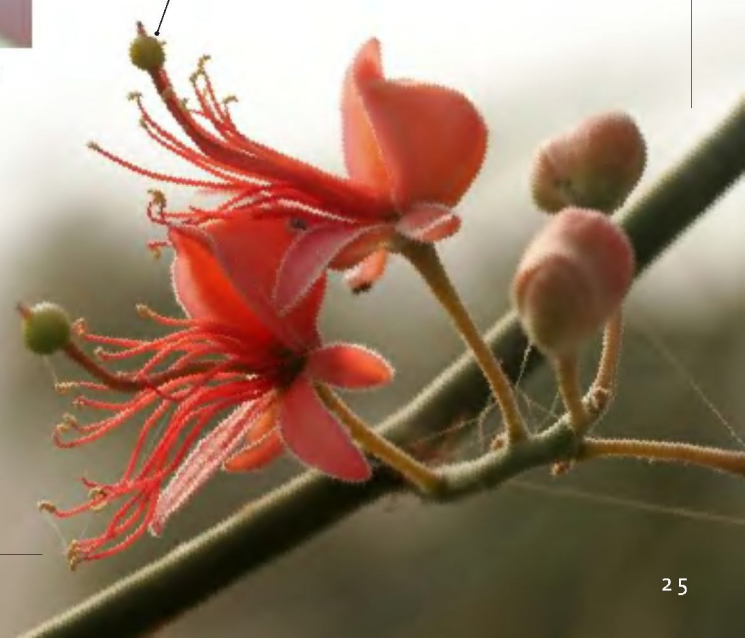
The astringent fruits are cooked or pickled and are also collected and dried for their medicinal value

A kair tree in flower in August

Mature leaves are less than 15mm long

green ovary

(BELOW) Note the bonnet-like outer sepal of the flower and the long red filaments



BARK grey-brown or pale brown, deeply furrowed and corky

SPINES in pairs, short, slightly curved, yellowish or red

LEAVES on young shoots only for a short time; small, narrow but fleshy

FLOWERS in lovely clusters, pink, brick-red or orange-brown; sepals unequal, 4 narrow petals; the green ovary protrudes beyond the stamens at the end of a long stalk

FRUIT pink or tinged purple, slightly smaller than a grape, with a grape-like bloom on the skin

mainhar MAYN-hrr

mainhar • mainphal • mannial • manda • gehela • gera • karhar | emetic nut

Catunaregam spinosa

Rubiaceae - coffee family

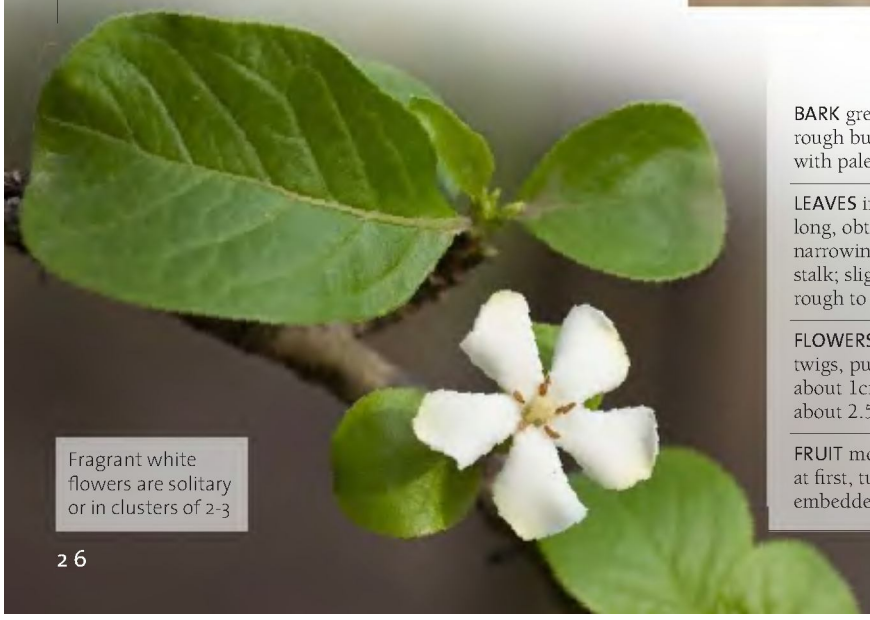
SEASONS : *LEAVES shed late in winter, February-March. New leaves in May but canopy fully renewed only by June. FLOWERS along with the leaves in May-June, and a second flush with the first rains in July. FRUIT green, fully formed by October, ripening December-January*

Mainhar is a stiff, spiny understorey shrub more common in sal forests. Occasionally however it finds opportunity in the open and then branches freely to form an intensely bushy, small tree. Just before the rains begin, mainhar puts out innumerable fragrant blossoms. Like most other members of the gardenia family, the pure white flowers last just a day, then fade rapidly to 'old gold'. Mainhar is found in both sal and mixed forests throughout our area and is widely dispersed through the Indian subcontinent and parts of tropical Africa. The unripe fruit is used to poison fish. The bark, rind and fruit pulp all find use in traditional medicine. The thorns are used for piercing ears and the tough wood for making implements and walking sticks.

Mainhar is very variable and becomes tree-like only when it grows in sunny, open situations

The ripe fleshy fruit is roasted and eaten and has medicinal uses

SPINES in pairs in leaf axils, especially long on young coppice shoots



Fragrant white flowers are solitary or in clusters of 2-3

BARK grey- or dark-brown, not very rough but shallowly fissured and dotted with pale lenticels

LEAVES in clusters, small, less than 7cm long, obtuse or shortly pointed at apex, narrowing at base into a slender leaf-stalk; slightly hairy or not and somewhat rough to the touch

FLOWERS at the tips of short leaf-bearing twigs, pure white, turning yellow; tube about 1cm long, with 5 spreading petals about 2.5 cm in diameter; very fragrant

FRUIT more or less spherical, green at first, turning bright yellow; seeds embedded in a gelatinous pulp

katul KAH-tool

phendra • phetra • pindaru • thhalka • bhirada

Tamilnadia uliginosa
Rubiaceae - coffee family
SEASONS : *LEAVES shed late in winter. Trees remain bare till new leaves start to appear in April-May. FLOWERS from the beginning of the hot season in late April reaching a peak in June. FRUITS form early but only ripen some time between January and February*

A small, somewhat stiff, spiny tree with large shiny leaves that shows a distinct preference for moist savannas and low-lying swampy places, especially on black cotton soil. Katul is nowhere common but in its preferred habitat is sometimes seen growing in dense stands. Inside sal forests it tends to be solitary. Both its pure white gardenia-like flowers and guava-like yellow fruit are conspicuous clues to its identity. Katul ranges through dry forests in C and S India, Sri Lanka and Myanmar, avoiding NW India and the arid regions to the west. The raw fruit is collected as a vegetable. Its pulp is used as a mordant in dyeing and to treat diarrhoea. The pale wood is close-grained and is sometimes used for turning small articles.

Open grasslands and low-lying moist areas are the most likely places to see katul trees

BARK rough, very dark brown tinged with rusty red

LEAVES upto 20cm long, growing in close-set bundles. Shiny and smooth on top, hairy specially along the nerves beneath. Broadest near the top, usually with a blunt tip. Leafstalks very short

FLOWERS large, solitary, with 5-7 (most often 6) pure white waxy petals, nearly round, overlapping. Stamens also 5-7, anthers lying flat. Stigma prominent, 2-lobed.

FRUIT more or less spherical, upto 5cm long, shiny green turning yellow when ripe. Seeds embedded in a hard, dry pulp inside.

BARK (RIGHT) is typically scaly and warty and deep brown with a distinct rusty tinge

THORNS (BELOW) are usually 2 or 4, short and very sharp, growing at the ends of lateral shoots

"TREES OF DELHI *is a veritable treasure*"
– Khushwant Singh, *Outlook*

Jungle Trees of Central India is a lovingly detailed field guide to every tree you're likely to see in the magnificent dry, deciduous forests of the region. Bigger than France and encompassing 5 of India's most visited Tiger Reserves, Central India is home to the classical types of wilderness that one associates with the term 'Indian Jungle'.

Following on from his *Trees of Delhi* (2006), which set new standards for botanical field guides in India, Pradip Krishen spent three and a half years travelling intensively through Central India to bring you this book. "You don't have to be a botanist to enjoy trees," he says. "With this book in hand, anyone can learn to become an expert tree-spotter and take their enjoyment of wild places to another level."

ABOUT THE AUTHOR

Pradip Krishen gave up film-making in 1994 to write about wild plants and places for an audience of amateur enthusiasts. He wrote INTACH's guide to the Trees of Lodi Gardens in 2001 and published *Trees of Delhi – A Field Guide* in 2006. He works professionally as a Native Plants gardener and is Director of the 70-hectare Rao Jodha Desert Rock Park in Jodhpur. He is consultant to the Aga Khan Trust in Delhi for the recreation of Delhi's native micro-habitats in Sundar Nursery.

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