The Todas *have a long-standing association with the shola grasslands in the Nilgiris; they rely on these lands for their water, grazing of their livestock, rituals and healing traditions. Their eco-reverent cultural practices help to protect the biodiversity of these mountains.*

THE TODA BALSAMS

TEXT AND PHOTOGRAPHS BY TARUN CHHABRA

Two decades ago, my knowledge of balsams was restricted to specimens of 'busy lizzies' in my mother's garden. That changed when my *Toda* friend Kwattawdr-Kwehttn and I were out mapping their deity hills in the Mukurthi National Park, and from the eponymous peak, I asked him the name of an adjacent hill. He replied '*Nawtty-mehn*', and went on to explain that it translated as the 'balsam-summit', as that hillside is covered with a profusion of these flowers in September. The indigenous *Toda* people of the Nilgiri Hills in South India have long taken note of these wild balsams and had given the name *nawtty* to the genus. From that moment, I nicknamed this as the 'naughty' (as *nawtty* is pronounced in *Toda*) genus, and was smitten by his descriptions.

THE *TODA* GARDEN

The post-southwesterly monsoon period was still far away, but my vocation and *Toda* studies kept me preoccupied, and the months swept by. In the interim, I learned that the *Todas* used flowering cycles to indicate not only a particular time of the year, but also the stages within each season, and even the various climatic phases. In fact, the *Todas* recognise more than 20 star-weather-plant triads, representing different periods when the most visible planetary body, the weather pattern and a mass-flowering herb, all share the same name. The *Impatiens* genus (*nawtty*) is the fourth in the list of such triads.

The *Todas* share an intimate relationship with their surrounding flora, whose characteristics are interestingly varied, from accurately determining a person's anxiety level to their age. *Gentiana pedicellata, arkil-poof* in *Toda*, literally means the 'worry flower'; when held by the stem, the petals close faster for persons who are more anxious; it works accurately, and I have experimented with it now for two decades! Whereas the *Strobilanthes* species, known as *kurinji*, mass flowers in precise 12-year cycles. Virtually unknown to non-*Todas* is the 18-year cyclic flowering *pyoof-katt*, which has not even been documented by botanists.

At the onset of the southwest monsoon, Kwattawdr showed me the flowers of *kafehll(zh) Ceropegia pusilla* that are not only the indicators for this season, but the corolla provided the inspiration for the *Todas* of yore to model their unique rattan milk churning stick. And, as I crouched to inspect these plants that are just a few inches high, the flowers did indeed look like miniature churn sticks. As I christened them the 'churning stick flowers', Kwattawdr dug up and washed some tubers for me to munch on, mentioning that his people often cook these like wild potatoes, and the most avid consumers went on to live well into their 90s. As I chewed on the raw bulbs in the wilderness, my feelings of exhaustion melted away.

A BALSAM PARADISE

Although it was only July, the tune of a childhood favourite, 'Come September', spontaneously began to resound, and continued to do so for the next few months. Until the day when Kwattawdr, Bala (a doctoral student in Botany) and I set out for pastures in the Porthimund Reserve Forest. En route, we stopped by a gurgling stream, and that tune began to ring once again. Alongside, the moss-clad stones were looking resplendent with scores of blooms of the incredibly rare Nilgiris endemic *Impatiens laticornis*. A little further, several rocks appeared to be decorated for some approaching celestial event, with purple-red flowers of the rare endemic *Impatiens nilgirica*. As we walked into a shola forest, we were taken aback by the sighting of an unusual epiphyte that was revealed to be the original 'orchid balsam', *I. orchioides*, endemic to just a few square kilometres; its name derives from the resemblance to some orchids of the *Liparis* genus.

The adjacent grasslands were carpeted by the small flowers of *I. pusilla*, and almost every other vertical rock was festooned with salmon-coloured flowers of the endemic *I. pseudoacaulis*. The valley was glorious to behold, with myriad delicate white blooms representing different species of *Habenaria* ground orchids, and, letting my imagination run, some appeared to resemble dolls, an elephant's trunk and a spider. As I knelt down to Mother Earth in sheer reverence, and began photographing her emergent grandeur, I was so

Locating a species that is found only in one nook of the world – in this case, our backyard – and has taken millions of years to evolve into a distinct species, blooming for just a few weeks every year, can be the ultimate elevating experience.

1 Habenaria longicornu *has attractive doll-like flowers.*

2 Impatiens neo-barnesii *is a highly endangered endemic balsam with almost translucent blooms that have evolved into becoming epiphytic.*

3 I. neo-munronii – *our first novel discovery.*

4 *Rocks are festooned with the endemic,* I. pseudoacaulis.

5 *Scapigerous balsams like* I. clavicornu, *an endemic of the Nilgiris, are generally restricted to the Western Ghats and Sri Lanka.*

6 *The churning stick flower* Ceropegia pusilla.

7 *The extremely rare* I. munronii *is a relic from Gondwanaland.*

8 *The orchid-like balsam,* I. orchioides.

9 *The rare* I. debilis *(left) and* I. gardneriana *grow alongside.*

10 *The rarest of all Nilgiris balsams,* I. denisonii.

To anyone who has seen wild balsams in their natural habitat, with their intriguing forms (usually related to specific pollinators) and the vast areas that some species carpet during the peak flowering season, it is apparent that these ancient plants are not inferior to any other.

entranced that it was only an unfamiliar sound that made me providentially look up to see a sloth bear running straight towards me. Our eyes met and he stopped short, looked deeply into mine, and turned back into the shola. There was no trace of fear within either of us. My botanical initiation had taken place!

TODA PLANT TAXONOMY

From then, much of my spare time from a dental practice was spent in search of intriguing plants that the *Todas* relate to, while also identifying them scientifically. For example, *avful*, a wetland grass used by them to thatch their dairy-temples, is becoming increasingly scarce. When we sent (along with botanists J.P. Puyravaud and D. Mohandass) flowering specimens to an expert at the Royal Botanic Gardens at Kew, we were surprised that he identified it as *Eriochrysis rangacharii*, a species that the *Red Data Book of Indian Plants* presumes to be extinct, notwithstanding the fact that the *Todas* use it sustainably as an important thatch material! In fact, ever since the *Todas* have been disallowed to carry out their ecosystem management practices, like the annual ritualised firing (with firesticks of *Litsea wightiana*; incidentally, fire must only be made in this manner even today for all their important rituals, like lighting of the sacred lamp) of select grasslands, such vital species have been pushed to the brink. This endangered grass is now restricted to some large wetlands in the southwest of the plateau, and found nowhere else on earth. Its extinction would not only mean the loss of a vital cultural species – since the *Todas* are not allowed to substitute it when thatching their sacred dairy-temples – but also the disappearance of an important aspect of biodiversity. Experienced botanists find the identification of such species challenging, but *Todas* can readily recognise it even from a distance, no matter its phenological condition (i.e. it need not be in a flowering state). Clearly, *Toda* plant taxonomy is a subject that requires serious analysis.

As I pored over the century-old *An Epitome of British Indian Species of* Impatiens by the legendary botanist J.D. Hooker, the realisation dawned that although the upper Nilgiris was perhaps the focal point of balsam speciation in the Western Ghats, many had not been recorded since type collection.

TODA ECOLOGICAL KNOWLEDGE

Every trip into the wilderness was a journey into the past, as we not only rediscovered elusive balsams, but, in the company of Kwattawdr, were also regaled with ancient *Toda* legends and shown sacred sites, besides experiencing adrenaline surges whenever we chanced upon the elusive tiger, a herd of sprightly Nilgiri tahr, or glimpses of plant luminescence on a new moon night. I was able to authenticate many aspects of *Toda* traditional knowledge. On one trip to the Avalanche area, I established that Kwattawdr did not mention in jest that Nilgiri tahr ventured this far interior, and that the hitherto unrecorded, but legendary, white rhododendron actually existed in the uppermost reaches of the Nilgiris. On other trips, he showed how certain ants got their cousins to do their chores for them! The idea seemed to be ludicrous until I read the paper by E.O. Wilson (one of the people credited with the introduction of the term 'biodiversity') on *Slavery in Ants*. Indeed, *Toda* elders say that other insects – including the carpenter bee *Xylocopa* sp. use the same modus operandi.

ABOVE LEFT *The salt water-pouring ceremony for the sacred buffaloes is an indirect form of ecosystem management performed by all* Toda *clans, during various seasons; aside from providing brine to buffaloes, this is considered a prayer for an abundance of rain and thus a healthy ecosystem.*
ABOVE RIGHT *Members of the* Toda *community along with their priest in prayer at a* Toda *temple, during the salt water-pouring rites. A failure to perform this is deemed as an invitation for ecological ill health even today.*

The Nilgiris phytogeographical region is home to around 40 species of Impatiens, *of which close to 50 per cent are endemic to this minuscule area; many species are in turn restricted to habitat ranges extending over just a few adjacent valleys, and to their own specialised niches.*

On subsequent excursions to the western edges of the Nilgiris, we found different coloured forms of the rare endemic *I. munronii*. This species is directly related to some African species of *Impatiens* that are both bird-shaped and pollinated – like the well-known *I. niamniamensis*, popularly known as the 'Congo cockatoo'. Species from the Nilgiris like *I. munronii* and *I. jerdoniae* give credence to the Gondwanaland origin hypothesis that also explains why wild balsams from South India, Madagascar and parts of Africa show affinity. Since the Himalaya was formed only during the mid-Eocene era, the *Impatiens* species found there are quite different from the South Indian and Sri Lankan ones. Indeed, the higher reaches of both these areas have just one species in common, i.e. *I. chinensis*.

The generic name may sound peculiar until one sees how a ripe fruit pod tends to curl up inwards, and does so, so forcefully, that the seeds are ejected some distance away. Hence they are said to be 'impatient' to throw forth their seeds and restart growth. Erasmus Darwin (the grandfather of Charles Darwin, and himself a multifaceted physician, naturalist, and inventor) composed a poem on the genus:

With fierce distracted eye Impatiens *stands,*
Swells her pale cheeks and brandishes her hands;
With rage and hate the astonished groves alarms,
And hurls her infants from her frantic arms.

This genus contains well over 200 species in India, more than half of which occur in the Western Ghats. The Nilgiris phytogeographical region is home to around 40 species of *Impatiens*, of which close to 50 per cent are endemic to this minuscule area; many species are in turn restricted to habitat ranges extending over just a few adjacent valleys, and to their own specialised niches. Nothing can substantiate the development of the western Upper Nilgiri plateau into an upland island and a major centre for plant speciation better than this example of *Impatiens'* endemism.

The Western Ghats (along with Sri Lanka) is home to an endemic group of scapigerous balsams that are 'stem-less', in that they grow from scapes that emerge directly from tuberous roots. With balsams rivalling orchids in sheer beauty and bizarre form, it is surprising that they are not as well known. To anyone who has seen wild balsams in their natural habitat, with their intriguing forms (usually related to specific pollinators) and the vast areas that some species carpet during the peak flowering season, it is apparent that these ancient plants are not inferior.

REDISCOVERING LOST NILGIRI BALSAMS

After a few years, and numerous trips walking across all sorts of slippery country, where my trusted *Toda* handcrafted walking stick often served as a third leg, we had found most of the Nilgiri wild balsams documented during the British era. But two rare endemics continued to elude us – *I. neo-barnesii* and *I. denisonii*. We risked injury while searching remote sholas for the former, but all efforts came a cropper.

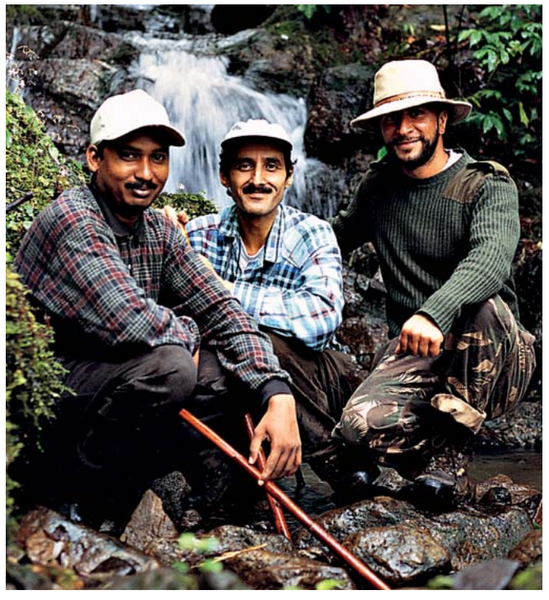
Then we realised that a species of this genus was present exclusively on moss-covered trees like an epiphyte, which was never in flower during our September trips (but was fruiting). It finally dawned upon us that this species perhaps had an early flowering cycle. The following year, we made a trip in August, and were astounded to spot beguiling, creamy blooms of delicate *I. neo-barnesii* on tree trunks and branches at the western edges of the plateau.

The Type (collected specimen of a new species) of *I. denisonii* had been collected from the Sispara Ghat across the contiguous Mukurthi and Silent Valley National Parks. For two years, we searched this outlying area in vain, although we rediscovered other little-known endemics like *I. debilis*. We also found a variety of *I. scapiflora* that was described by botanists as a novel species, *I. minae*, many years later! On our third trip, we chanced upon a scapigerous hygrophyte perched upon a rock that was dripping with water, and appeared different. As we looked at these mesmerising blossoms from every angle, leeches crawled onto our torsos from all aspects – boots, tripods and even *Toda* walking sticks! We then realised that the line illustration and description of the floral spur in Hooker's publication was erroneous, and that it was indeed the lost balsam of the Nilgiris – *I. denisonii*. This was perhaps the first scientific collection of the species since British naturalist Richard Beddome documented it in 1862. Plant hunting even in the 21st century can thus be extremely gratifying. Locating a species that is found only in one nook of the world – in this case, our backyard – and has taken millions of years to evolve into a distinct species, blooming for just a few weeks every year, can be the ultimate elevating experience.

The Todas *use sticks of* Litsea wightiana *to make fires for all important rituals, such as the lighting of the sacred lamp.*

Clusters of the small flowers of Impatiens pusilla *dominate the landscape during September.*

COURTESY: TARUN CHHABRA



The team – (from left) R. Ananthan, Tarun Chhabra and Ramneek Singh – scouting the steep western slopes. The rock behind Ananthan is covered with I. lawsonii.

NOVEL DISCOVERIES

Well, almost. One day when we were walking at the south-western edge of the plateau, we chanced upon a picturesque ravine with a roaring stream crashing down on one side, and as we gazed down in sheer wonderment, our eyes settled on a distant cluster of pink blooms providing a striking contrast to the green foliage of some tall *Strobilanthes* sp. shrubs, at the foot of this precipice. When I glanced through my binoculars, I saw a terrestrial plant with unusual flowers of an undetermined genus. As we continued to pore over this marvel of creation emerging from *terra incognita*, our excitement knew no bounds. From where we stood, it appeared impossible to reach that location, but it could perhaps be approachable from the other aspect that had steep grassland merging into the abyss. Our usual team consisting of tea planter and friend, Ramneek Singh and botanist, Ananthan, reached the other side from where I guided them towards the flowers, step by step. It was so steep and treacherous that they were soon crawling on their fours. Tense moments followed when I could not spot them within the bushes. They finally managed to collect some specimens and made it back with what we instinctively realised to be a neo species of wild balsam.

It was humbling to realise that we were looking at an undocumented species that occurred only in this region, and perhaps in some adjacent, equally inaccessible slopes, and whose family (Balsaminaceae) lineage went back to around

The Mukurthi National Park and its surroundings that constitute the core of the Nilgiri Biosphere Reserve (the first such in India) have remained in a pristine state due to the management practices followed by the Todas *over the centuries.*

fifty million years. I managed to grow a cutting at home for some years, where the sporadic inflorescences were treated with sheer veneration. It was not until a decade later that taxonomists described this as *I. neo-munronii*, apparently without seeing it *in situ*, as it is in no way allied to *I. munronii*.

It took another dozen years to take the next significant step in this domain. By the end of 2015, I had published the ethnographic and ethnobotanic book, *The Toda Landscape: Explorations in Cultural Ecology* (Harvard Oriental Series, Vol. 79), and now decided to study the herbaria of our *Impatiens* collection. The Western Ghats expert in this genus, Prof. V. Bhaskar, graciously did the micro-morphological analysis of seeds and pollen; he later confirmed that three taxa were new to science. I avidly began studying plant taxonomy, which I found as interesting as the human anatomy of my college days. Experts like Dr. K.M. Prabhukumar co-authored the article. I (along with Ramneek Singh) was determined to give all three novelties *Toda*-related nomenclature i.e. *I. kawttyana* and *I. taihmushkulni*, based on the *Toda* deities who are believed to reside in the eponymous hills from where the type specimens were collected; the third, *I. nilgirica* var. *nawttyana* was named after the *Toda* name for this genus, viz. *nawtty*. The findings were published in the *Nordic Journal of Botany* in December 2016.

NATURALISTIC *TODAS*

Certain species also have more specific *Toda* epithets – for example, the Nilgiri endemic *I. rufescens* is called *tehrnawtty*,

The *Todas* are a small group of around 1,450 members, and represent a rare example of pacifistic indigenous people who are generally vegetarian. With their quaint barrel-vaulted architecture, their embroidered cloaks (now with a Geographical Indication patent obtained by the NGO, the *Toda* Nalavaazhvu Sangam/*Toda* Welfare Society) and their magnificent unique breed of long-horned buffaloes, they have fascinated the world ever since the British stepped into the Nilgiris exactly two centuries ago. Their culture revolves around these herds, with each of the six grades of dairy-temple having a corresponding herd of sacred buffalo. Into this buffalo cult, they have incorporated a wide array of rituals.

literally, 'swamp balsam', which is otherwise commonly known as the 'pink marsh balsam'. Not surprisingly, the sacred *Toda* name of a wetland is *Nawtty-tehr*, and it houses a significant population of *I. rufescens*, besides other species of this genus. Some old *Toda* songs mention balsams, and there have been men with related names like *Nawtty-nehrsh*.

It is no exaggeration to state that the Mukurthi National Park and its surroundings that constitute the core of the Nilgiri Biosphere Reserve (the first such in India) have remained in a pristine state due to the management practices followed by the *Todas* over the centuries. We now need to remove all exotic plants from this area, and also to extend the size of the Protected Areas substantially.

A carpenter bee Xylocopa *sp. hive within rhododendron wood. The author was also able to establish that white rhododendron actually existed in the uppermost reaches of the Nilgiris, a hitherto unrecorded fact.*