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Foreword

I am truly delighted to see this very vividly colourful E-book on butterflies for children brought out by Nikhil Bhopale and his team at Green Works Trust. I am very happy for this very unique initiative because writing for children is lot more difficult. Here, they have very creatively used colourful illustration and simple language for a child to understand and get interested to know more about butterflies.

After seeing this book so attractively designed and profusely illustrated, I truly envy today's younger generation for having such resources at their disposal to learn so early. I wish somebody should have written a book like this when I was in school; so much I missed.

This is a perfect way to introduce children to our nation's rich biodiversity and spread awareness among the younger generation that will encourage them to study and protect our natural heritage. I am sure that such innovative initiative will attract younger generation to appreciate insects like butterflies, moths, dragonflies and other insects with a renewed interest. I am glad that Nikhil and his team has taken a good lead in their pursuit to spread awareness among the younger generation, and I congratulate him and his team for bringing out this very interesting book.

Nikhil is an excellent naturalist, as I know him since he was part of my team when we were at the BNHS. I am glad that he has chosen this path to bring people closer to nature. I wish him the very best in this endeavour. Though Nikhil has written this book for children, I am sure even their parents and teachers are surely going to fall in love with these flying jewels, and together, they will surely strive hard to protect nature, which is now the need of the hour.

- Isaac Kehimkar Chairman and Director, iNaturewatch Foundation, Navi Mumbai

I still remember the days of my childhood playing (rather messing!) with butterflies, dragonflies, damselflies, fireflies, crabs, frogs and other tiny creatures. Yes, I am specifying 'tiny creatures' because THEY were the ones who gave ME the feeling of 'How giant I am!' Rest everyone around were taller than me. Catching butterflies, tying thread to tails of dragonflies, holding wings of damselflies, keeping fireflies in a matchbox, holding a stick in front of crab and observing them hold on to it by their massive claws, jumping with frogs... all of these kept me actively curious.

a much higher level.

Now, as I write this book on butterflies, I recall all my wonderful experiences which I have collected from the field. I thank my lovely team who worked tirlessly with me to put this book together. And I thank my wife Dipali Bhopale, my son Sarus and my parents Rekha and Milind Bhopale for always allowing me to chase my non-materialistic goals, allowing me to continue my passion, and giving me immense encouragement for making of this book

Author's Note

I was just 11 when my mother encouraged me to go for treks and nature camps. Possibly this triggered my initial interest in natural history which grew leaps and bounds with time. I entered this field as a snake rescuer and met people with similar interests. This led me to more people from varied fields and my curiosity led me to other fields too. I learnt a lot about birds from my friend Mr Sudeep Athavale. Later, I came across some books on butterflies which Sudeep had. And that was my first introduction to butterflies. The book was written by Mr Isaac Kehimkar. My luck brought me to BNHS where I was fortunate enough to work with this eminent author. His continuous encouragement raised my interest in butterflies to

- Nikhil Bhopale



Common Wanderer ©Krupa Patil

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Welcome to the world of butterflies



They are butterflies!! Actually, they are hexapods and belong to Sub Phylum Hexapoda; Class Insecta; Order Lepidoptera. Difficult to understand, is it? Let's go step-by-step.

- They are invertebrate creatures with six legs. Hence, called Hexapoda which means 'sixlegged'. ('Hex' means six; 'poda' means legs)
- Hexapods are divided into two Classes. They are the Class which has mouth parts outside the body and thus, fall in Class Insecta.
- And, they are insects with scaly wings hence, they get placed in Order Lepidoptera. In Latin, 'lepid' means scales and 'pteron' means wing.

Didn't know that butterflies had scaly wings?? Well, read this book and get to many more fascinating facts about them.

`Lepidoptera' may seem like a big word, but let's make it simple for you. Just say... lay + pee + dop + tera

How many are they?

There are about 17,000 to 20,000 species of butterflies on the back of this Earth out of which, about 1335 species are seen in India.

Our home sweet homes

about 5400m above sea level. That is as high as the 1800th floor of a super tall building.

Size does matter

wide-spread palm.

The

smallest



We stay almost everywhere— in gardens, jungles, on shores, in deserts, on mountains and in snow... and in cities too. You can often see us right outside your window.

Butterflies have been seen in places where temperatures flare up to 50° C and also where they drop as low as -20° C. They have been seen at high altitudes; as high as

DID YOU KNOW THIS? Butterflies are seen in all continents of the Earth, except Antarctica.

0

Butterflies can be as tiny as a micro sim card. The tiniest known butterfly is the Small Grass Jewel which is all of 12mm. And the biggest one is the Southern Birdwing which measures 190mm; except one known individual of Golden Birdwing which measured 194mm! That's as tall as your school notebook or as big as your



Who named them 'butterflies'?

Who on Earth decided to call it a "butterfly"? And why?? Does it really look like flying butter?

It is believed that a long, long time ago, when a man saw a Yellow Brimstone butterfly, he exclaimed in excitement, "That's a Butter-fly". Its bright yellow wings seemed like a flying blob of butter to him. And thus, the name spread far and wide.

Can you believe it? All butterflies actually have names. And there are pretty interesting stories behind naming butterflies. You can read about them on page <u>48</u>.

Going places

Butterflies are so attractive that they have found their way to Indian postal stamps. Several postal stamps are dedicated to these flying jewels which travel far and wide stuck on



Long long ago

Butterflies have been on this planet much before humans came into existence.



They have stayed here since the times when the enormous dinosaurs ruled this planet. Some of the oldest butterfly fossils are 200 million years old. Whoa!!

ong long ago, Lord Brahma created this beautiful world—land and water, plants and trees, flowers and fruits, animals and birds. He loved all his creations, but the plants and flowers were his most favourite.

One day, Lord Brahma found that all the leaves on the plants were chomped off. He wanted the culprit arrested. A caterpillar humbly confessed that he was hungry and that he had gobbled up all the leaves. Lord Brahma's anger knew no bounds. The angry Brahma cursed the caterpillar.

"You shall become like a stone forever; with no legs to walk and no jaws to eat. You will just hang by the leaves, but won't be able to eat those leaves again!", said Brahma.

And the caterpillar hung on a leaf like a lifeless blob. Days passed by. Unable to bear the caterpillar's plight, a few good-hearted birds and animals pleaded to Lord Brahma to forgive the poor caterpillar. Brahma agreed to free the caterpillar in a few days. The caterpillar fell at the Lord's feet in gratitude. Brahma was pleased with the caterpillar but, couldn't take back his curse completely. Instead, Brahma granted a boon and said, "Henceforth, every caterpillar would go to sleep like a lifeless blob for a few days but, wake up as one of world's most beautiful creatures—the butterfly!"



Lime Butterfly ©G K Saji

All living creatures grow. Babies grow up to become adults. But in most cases, they grow in size and the adult looks similar to its young one. Look at this praying mantis. However, some creatures, like the frog and the butterfly change their forms completely as they grow.

Look at these pictures. The butterfly eggs are 'small and round'. The caterpillar is 'green and long'. The pupa is just a hanging 'blob'. And the butterfly is a 'colourful, winged creature'. There is nothing in a caterpillar that tells you it is going be a beautiful butterfly. This transformation while growing up is called 'metamorphosis'.

Metamorphosis in butterflies

Oh, that BIG word means 'growing up'!

Huh? Change forms?? What does that mean???



Let's make this word easy to say. You just have to say...

Take a look at some photos showing the metamorphosis of a Lime butterfly.









A butterfly changes its form 4 times in its entire life. These are called the 4 main stages of the butterfly. Let's get to know what really happens and how the eggs transform into beautiful, winged butterflies. It's like magic; let's take a look.

(12)

1 Eggs

The story begins when a Mamma butterfly lays tiny eggs on a plant. When the caterpillar is ready to come out, the egg turns transparent. You can even see the baby caterpillar inside.

DID YOU KNOW THIS? Each egg has a tiny hole called micropyle which allows in-and-out flow of gases.

caterpillar

2 Caterpillars

When the caterpillars hatch out of the eggs, they are mighty hungry. But guess what? Their thoughtful Mamma butterfly has selected a plant with lots of fresh green leaves. The hungry caterpillars just eat and eat and eat! And they become fatter and fatter.

This is the only stage in which they grow in size. They grow so rapidly that the caterpillar can no longer fit into its own skin. So the skin is shed and a new skin is ready underneath. A caterpillar can do this `change of clothes' several times. Each time it changes, it gets a new look called the `instar'.

DID YOU KNOW THIS? Baby caterpillars are also called larvae or grubs. By now the caterpillar is tired of eating and it decides to pupate.



B Pupa The caterpillar m It is also called th

happens! Inside the pupa, the caterpillar melts into a mushy juice. The juice slowly and steadily starts transforming and a beautiful butterfly starts to take form. The body, the antennae, the legs and... the wings! When the butterfly is ready inside, the pupa becomes transparent and you can see the butterfly tightly packed inside

and you can see the pupa.

DID YOU KNOW THIS?

The process of a butterfly emerging from its chrysalis is called **eclosion**.



The caterpillar makes a small house for itself called the pupa. It is also called the chrysalis. This is where the real magic

4 Adult butterfly

Very often, in the early hours of morning, the butterfly decides to emerge from the pupa. It breaks open the pupa and struggles it way out into its new world.

The newly emerged butterfly has wet, crumpled wings. The butterfly has to unfold its wings by strongly pumping a fluid into the veins of its wings. Then the wings have to be dried completely. Once the wings are dry, the butterfly is ready to take flight. When the Sun comes up and shines, the butterfly basks for a while and then takes its first flight.

Profile

Oh, that's such an old picture. I must update my DP and change my status right away!!



This butterfly goes in search of food and a mate. Upon mating, the female will lay eggs and thus, the cycle of life continues.

Life stages caught on camera

Here's a collection of photos which document interesting events from the life cycle of various butterflies.



All photos in this collection © Milind Pandit except, photo of egg with 1 rupee coin © Nikhil Bhopale

The secret of 'Diapause'

Butterflies have a phenomenal ability of taking a 'pause' in the early stages of their life, if they sense any adverse conditions. For example, the caterpillar can delay its birth from the egg, if the weather outside is not suitable. And how do they know that? Read * on page <u>12</u> to find out.

Caterpillars give up eating and go into an inactive mode. Look at this caterpillar taking a long sleep. This is called diapause.

On the other hand, adult butterflies take a long sleep - in winters, it is called hibernation and in summers, it's called aestivation.



Southern Birdwing ©Paresh Kale

is made up of 3 parts: head, thorax and abdomen. The head carries 4 important organs, which are the eyes, the antennae, the proboscis and the palpi. The thorax is the middle part of a butterfly's body. It carries the most attractive part of a butterflyits wings. The thorax also bears 3 pairs of dainty legs. The abdomen is the tail end of the butterfly's body which has segments and it hosts several important systems. Let's take a closer look at the body parts and their uses.

Knowing the anatomy

I am just so fascinated by their colourful wings.

Like all other insects, the body of a butterfly



1 Eyes

A butterfly has two types of eyes. They have two simple eyes which are very small and not even visible to us. What we see is a pair of **compound eyes**. These special kind of eyes have lots and lots lenses.



Our vision is 'trichromatic'. This is because, we have 3 types of cells in our eyes. But butterflies have about 6 types of cells, thus showing them many, many more colours. Wow, it must be fun to see like a butterfly!

What more... butterflies can also see UV light which is not visible to the human eye. Check this out...



The body of a butterfly

2 Antennae

The head has one pair of thin, erect, hair-like outgrowth called antennae. Each antenna has a shaft and a clubbed tip. Antennae help butterflies for detecting their food. They also use their antennae to find and choose their partners.

3 Palpi

Olfactory organ of the butterfly- the palpi are located right in between the eyes. Along with antennae, the palpi help in detecting the butterfly's food.

Proboscis

It is the butterfly's very own, reusable straw which stays coiled up until it's thirsty. See how this butterfly sips

yummy nectar from the flower using its long proboscis. The abdomen hosts all the important functions like digestion, excretion, reproduction and even, respiration. The butterfly breathes through spiracles, which are tiny holes on either side of the abdomen.

D Legs

3 pairs of legs stick out of the thorax. Each leg has a thigh, a shank and a foot... just like ours. But, their legs are so dainty that these parts are not easily visible. However, on a closer look, one can even see a pair of claws on its foot.

Wings

5

Every butterfly has 2 pairs of wings- 2 fore wings and 2 hind wings. With a variety of shapes and sizes, the wings are colourful and have attractive patterns on them. The wings help the butterfly to fly and they also help to maintain balance while flying in strong winds.

So who painted these lovely wings? The truth is that the wings are actually transparent or sometimes, semi-transparent. But they are covered with thousands of tiny, **overlapping scales** which are coloured. The wings appear colourful because of these colourful scales.

Abdomen

Why do butterflies need claws? Have never seen them hunt or kill prey. Turn to 🌸 on page 20 to find the answer.

Surprising facts about butterflies

You use your ears to HEAR. And I hear from my entire body. Cool, isn't it?

> Your brain is inside your head and mine is in my thorax.

You can BREATHE with your nose. And I do with my abdomen!!

> You can WALK, RUN and JUMP with your two legs! But my six legs help me TASTE! Beat that!!



DID YOU KNOW THIS?

The caterpillar has a dozen tiny eyes... 6 on each side of its head. But, believe it or not, it is still almost blind. It can only sense light and detect shapes.

The body of a caterpillar

Just like the butterfly, the caterpillar's body also is made up of 3 parts— the head, thorax and abdomen. However, the caterpillar has some organs which are not present in the adult butterfly. Let's get to know them.

Mouth parts

The caterpillar is a hungry creature and so Mother Nature gave it mandibles. These are mouth parts or jaws with which the caterpillar can chomp on green leaves. However, when the caterpillar turns into a butterfly, the mandibles get replaced with a proboscis.

Bonus legs

We know that the butterfly has 6 legs. But in addition to these legs, the caterpillar has 10 bonus legs which are attached to its abdomen. These do not have the same structure as the legs and hence are false legs. They are called prolegs or pseudo legs.



Prolegs are small, squishy, sucker-like stubs that help the caterpillar to grip on leaves and branches.

Special accessories

Some caterpillars have special organs like the nectary gland and osmeterium. Err...WHAT-rium?? Ha ha...Read more about them on * pages 28 and 29.



Common Jezebel ©Dattaprasad Sawant

Time for food? Now, you're talking!! Soups and salads, rotis and kebabs, idlis and dosas, pizzas and pav bhajis, cakes and jalebis... hmm, YUM! The mere thought of good food makes our taste buds happy, isn't it? Yummy food is loved and relished by everyone... babies, kids, elders... just everyone. But hey, it's not the same in butterflies. They do not feed all throughout their lives. Out of the 4 stages in their life cycle, only the larval and adult stage are 'feeding stages'. The other two are 'non-feeding stages'. That means, only caterpillars and adult butterflies can feed. And you know what? The caterpillars are the ones who can 'eat' because they have mouth parts which can chew. But butterflies can only drink with their straw-like proboscis. The eggs and pupae cannot feed because they do not have a mouth at all! So, let's find out what's in store for the thirsty butterflies and hungry caterpillars.



What do butterflies feed on?

Butterflies need various nutrients like salts and minerals and hence they feed on a variety of things. Some butterflies have a sweet tooth and they need a dessert along with their normal meal! These butterflies sip nectar from flowers and they get good amounts of sugar from it. Let's not forget—butterflies can only sip-and-drink. Let's check out what's on their menu.

Flowers



Blue Oakleaf feeding on a custard apple

Butterflies can detect their food from a distance. They sit on the flowers and put their proboscis inside the flowers to suck out nectar.





Butterflies feed on fruits too. But they seem to prefer rotten fruits which are softened and probably more juicy. Thus the proboscis can effortlessly suck juices from these fruits.

The human connection

Believe it or not... butterflies not only drink human sweat but they also feed on other body fluids like urine.

oozes out from the bark. They suck this sap using their proboscis. Black Rajah feeding on tree sap

Butterflies feed on tree sap which

[©]Milind Bhakare

Sap

4 Leaves

Have you seen butterflies perched on leaves for a long time? If you observe closely, you will notice that they scratch the surface of the leaves with the tiny claws on their feet and then sip the oozing liquid. Why so? Turn to \ast page <u>29</u> and find out.



Animal carcass juices from dead carcasses of insects. fishes. snakes. tortoises. crabs and even birds.

> Great Nawab and mmon Nawab feeding on scat



©Kunal Chakraborty

Can you imagine anyone having a feast on poop? But butterflies actually do it. Some butterflies enjoy feeding on animal excreta like dung, scat and bird droppings.

DID YOU KNOW THIS?

If the butterfly's food gets dried up, the butterfly excretes a fluid on it to make it wet. Then, using its long proboscis, it sips on its moist food.

Butterflies not only feed on plant material, but also animals. Hey, they don't kill animals. They feed on dead animals. Butterflies have been seen sucking

Tawny Rajah feeding on a dead snake

∍Muktai Kuwalekar

Animal and bird excreta



Branded Straw Ace ©Nikhil Bhopale

Mud-puddling in butterflies

That's party time!! Really... Mud-puddling is like a party for butterflies.



It is a social activity where hundreds of butterflies. mostly males, of one or more species gather together on muddy banks of streams and ponds. And what do they do?

The male butterflies suc along with water from the wet soil. They may do this for hours. Gathering salts help them attract a female butterfly. The 'saltiest male' gets a female... easily! Read more about it on \star page <u>40</u>.

What's there for the hungry caterpillars?

The caterpillar is a small-sized eating machine with a HUGE appetite. When a caterpillar hatches out, its first meal is its own egg. After gobbling up the egg, this caterpillar now starts munching on the leaves around it. The caterpillar eats and eats and eats. Different caterpillars have different eating styles.

Let's take a look at a few:

Some chew the edg ©Krupa Patil

Some Punch holes in I ©Milind Bhak

eat from within by entering ©Milind Bhakare

A 'SMART' diet

Some species of butterflies choose milkweed plants to lay their eggs. When the caterpillars hatch out, they feed on the leaves of these milkweed plants.

> So, what's so SMART about it? Read on...

> > ay away.

The milkweed plants are poisonous. These caterpillars feed on the leaves of these plants. This makes the caterpillars poisonous and hence, predators stay away from them.

> This is indeed a 'smart dieť which gives the caterpillar protection from its predators.

Some caterpillars feed on fruits and veggies. Like the Cabbage White or Guava Blue caterpillars who enter inside and feed on the pulp from within.

Not just greens

Caterpillars don't just have a green diet. Caterpillars of some species are **carnivorous**; that means they eat other living animals. Like the caterpillar of the Apefly butterfly feasts on mealy bugs and scaly bugs.

DID YOU KNOW THIS?

Caterpillars are known to eat 27,000 times their body weight during this `hungry' stage in life.



We have read about what butterflies and caterpillars feed on. Now, it's time to know WHO feeds on THEM.

After all, it's nature. A predator today is a prey tomorrow. And butterflies are no exception.

It's a BIG BAD world out there for the Gecko feeding on Evening brown. ©Dattaprasad Sawant butterflies. Right from the time eggs are laid there are predators waiting to make a meal out of them. The eggs, caterpillars, pupae and butterflies— all are on the menu! And who are the predators? Let's find out. The list is really long. Take a deep breath and read on...

Butterflies on the menu

Green Marsh Hawk feeding on Jester ©Vivek Sarkar, Manoj Nair



The predators' marathon

A female butterfly is capable of laying up to 500 eggs. But, she lays about only 100 eggs, because many females die before laying eggs. Out of the 100, some eggs get eaten by predators like wasps, ants and only about 95 hatch. The caterpillars that hatch are highly vulnerable. About 85 of them are devoured by birds, wasps, spiders etc. Only 10 caterpillars grow fully and turn into pupae. Half of these pupae get eaten by lizards, ants or wasps or they die of desiccation or fungal infections. As a result, only about 4 emerge as butterflies!! Out of these, only 2 survive till they mate and lay eggs. The remaining 2 get eaten by monkeys, birds, spiders, lizards, dragonflies and frogs.

Jaw-dropping story, isn't it? Looks like predators are always on the look out for food. We'll now see some examples of how predators make a meal of eggs, caterpillars, pupae and adult butterflies.

In this scene, let's find out who's ready to attack.

Parasitoid wasp

Some parasitoid wasps lay their eggs inside the egg of butterfly. So when their larvae hatch, they feed on the developing caterpillar.

Wasps

This potter wasp first smartly paralysis a caterpillar and then drags it inside its mud house. Then the wasp lays its egg in the mud house and seals it, ensuring food for its hungry hatched larva.

Frogs

Frogs often silently wait near puddles or in moist mud and grab mud-puddling butterflies. These are called ambush predators.

Birds

This bee-eater chases its prey and swiftly catches it mid-air. It then sits on its perch and enjoys its winged meal. These are called pursuit predators.

Look how these ants attack and devour this pupa.

An interesting, unusual study

In Costa Rica, an unusual survey was done to study the feeding behaviour of a bird called Rufous-tailed Jacamar. And this study resulted in some interesting findings. Let's take a look at what exactly happened.

The Setup

In an enclosed area, Jacamars were offered more than 1600 butterflies of 133 different species.

The Feeding

Ignored at sight 35% Failed attacks 5% 20% Attacked; rejected 40% Attacked; killed and eaten

The Observations

Birds killed bright coloured butterflies, but didn't eat them. Dull coloured butterflies were preferred by the birds and eaten in much more numbers.



Think about it

When we say 'predator', most of us imagine a creature who ruthlessly catches, kills and eats butterflies and, our heart bleeds for the beautiful, winged jewels. Now, take a moment and think...

We have read the story 'The Predators' Marathon' on page 22. Now, just imagine if the female laid all 500 eggs and all those 500 survived to become adult butterflies. What will happen? Such enormous numbers of caterpillars will feed hungrily on plants and so many butterflies will eventually deplete all available food resources.

Predators actually keep a natural check on them. Now, do we still call them 'ruthless predators'? The choice is yours!



The butterfly is `c That means, the c butterfly easily ble the simplest way b We know that but important that the But how??

Trust Mother Nature to come up with some brilliant ideas which protect these delicate winged beauties from predators. 'Camouflage' is just one of the ideas. Let's find out more such ideas with which they keep themselves hidden and safe from their predators.

Nature to the rescue

What can you see in this picture? Do you see a butterfly?

> lt's not easy to find that butterfly. It is so beautifully camouflaged.

The butterfly is 'camouflaged'? What's that?

That means, the colours of the butterfly match the colours of its background. That makes the butterfly easily blend with the background and thus, difficult to spot. Getting camouflaged is the simplest way by which butterflies can keep themselves safe from predators.

We know that butterflies are surrounded by predators all throughout their lives. Hence, it is important that they keep themselves safe from these predators during all stages in their life.



05

Here are a bunch of examples to show how butterflies have developed protection measures to keep themselves safe from predators.



Hiding is the easiest tactic that one can use to keep safe. Just stay at a place where no one can see you. SIMPLE!

Mamma butterflies usually lay eggs on the underside of the leaf.

©Milind Bhakare

We'll sure protect you

Even the caterpillar knows that it has to pupate under the leaf. Hence, many pupae are seen on the underside of leaves.

> Some caterpillars roll up inside leaves and stay there. They peep out to eat and again go back into their hideout. They even pupate inside rolled leaves.

> > Thanks for the

ummy treat.



In nature, it's an unsaid rule that anything bright and shiny is dangerous. One must not go near it. And that's what some butterflies use to their advantage. Look at the metallic-shine of this pupa of a Common Crow butterfly. And see the alarming red wings of the Plain Tiger

> butterfly which keep predators at bay.



Make friends!

Caterpillars of some species of butterflies stay with ants. These caterpillars have a special gland called the nectary gland. * It gives out a sweet syrup which the ants relish on. In turn, the ants fiercely protect the caterpillar from its predators. Smart friendship, isn't it?



Yes, butterflies ARE indeed very smart. And Mother Nature has given them special gifts, too. Take a look at this butterfly.



The hind wings have black dots that look like eyes. The wings have tiny tails also, which look like antennae. When the butterfly sits, it moves these 'false antennae' and distracts attention of the predator. The predator gets fooled and grabs the tail while the butterfly takes flight and escapes.



©Vasudeesha Hosabettu

See how this Slate Flash butterfly has made an easy escape from a predator.

Some caterpillars 'play dead' when they see danger approaching. They drop down on the ground and stay still, as if dead, till the predator has gone away.



DID YOU KNOW THIS?



Caterpillars of some species of butterflies look fully armed with armour. They have some outgrowths which look like horns and give them a scary appearance.



Some caterpillars even have a special weapon. When they are threatened, two horn-like organs shoot out from their head. That's called osmeterium. The osmeterium gives out a strong smell which shoos-off the predator. \star



Perfect potion! 🔹





What's mimicry? It is the action or skill of imitating someone or something, especially for entertainment.

But in nature, mimicru means close resemblance of a plant or an animal to another plant or animal or object, especially for protection.



Snake look-alike

ine Snake.

The caterpillar of the Great Orange Tip butterfly is a wonder. This little caterpillar looks like a Vine snake.





Butterfly? Nah!

It's a dried leaf. Indeed, this butterfly looks like a dried leaf and the drab colours offer fabulous camouflage in the leaf litter.



Have you seen mimicry artists in entertainment shows? It is fun to watch them mimic celebrities — famous film stars, singers and politicians. They dress up like that celebrity, they talk like them, they walk like them and they act like them and make the audience roll in laughter. But some butterflies take mimicry very seriously. For them, it is not entertainment. It is survival! Let us see an example: The

The

mimic

A Plain Tiger butterfly is poisonous and it shows off its bright orange-red colour to warn its predators. If a predator (let's say a bird) eats this butterfly, it causes terrible vomiting. Now, that's called 'food poisoning'. The bird eats it once and learns a lesson for life. Because of this, birds stay away from these butterflies.

The Danaid Eggfly, on the contrary, is not poisonous, but it has smartly evolved to mimic the Plain Tiger. It not only looks like the Plain tiger but also imitates its slow flight. The predators mistake it for the Plain tiger and thus, do not dare to eat it.

Another such example is the poisonous Common Crow being mimicked by the nonpoisonous Great Eggfly. That's called, Batesian mimicry.



©Hemant Ogale

There is a different kind of mimicry called the Mullerian mimicry. Here, many different distasteful species mimic one another. They all are different species; but they look the same and they taste the same-YUCK! So every time a predator goes for them, they remember the 'look' of the butterfly and decide never to take it again. Look, there are 5 butterflies of 3 different species on this bush.

The model-mimic bond

Nikhil Bhopale

DID YOU (NOW THIS? Only females do mimicry; males don't.

©Krupa Patil

model

Fhree-in-one

Some butterflies use not-just-one, but multiple ideas, at a time, to save themselves from predators.

Just imagine this... YOU are a predator; let's say a bird! You are looking for food and you spot a lovely blue butterfly flying around you in a forest. You lock your eyes onto it and keep tracing its flight. Suddenly, the butterfly goes missing! "Where did it go??",

you wonder.



That's the game of the Oakleaf butterfly. Suddenly, while flying, it sits on a tree trunk with its wings fully closed. The underside of the wing of this bright blue butterfly is dull, drab and brown. It looks just like a dried leaf. It opens its wings, once in a while, to show off the blue colour, reminding the predator that bright colours in nature means danger! That's called 'flashing' colour. Thus, bright colour + mimicking dried leaf + flash colouration becomes the Oakleaf's safety formula.

Another example is this Tiger Palmfly butterfly. The underside of its wing has cryptic patterns which camouflages with tree trunks. And the upper side looks like the distasteful blue tiger butterflies; flashing the bright blues. Thus, camouflage + bright colour + mimicry is the safety formula for the Tiger Palmfly.



©Samir Gulavane

Don't you like going a holiday in the hills. adequate food. That Basically, butterflies conditions— be it ha Different species of migrations observed Short Distance Migr Dispersal Migration. Let's take flight to t

United we survive!

Caterpillars of the Tamil Lacewing butterfly sit huddled together and appear bigger. Probably the red colour of all these caterpillars comes together to put up an alarming signal to predators.



Butterflies on the move

OMG... so many butterflies! What are they all doing here?

> They are resting during their migration journey, you see.

Don't you like going on a long vacation? When your city gets too hot to handle, you go for a holiday in the hills. Butterflies also go off on a journey in search of suitable weather or adequate food. That's called migration.

Basically, butterflies are very delicate insects. They cannot tolerate extreme weather conditions— be it harsh heat, extreme cold or heavy rains — and hence, they migrate. Different species of butterflies do different types of migration. There are 3 types of

migrations observed by scientists and experts. They are Short Distance Migration, Long Distance Migration and Dispersal Migration.

Let's take flight to the next page and take a look at the 3 kinds of migrations with some live examples.

DID YOU KNOW THIS? Butterflies are known to migrate over land, hills, deserts, rivers and even seas.



Short distance migration (SDM)

Hi! I am the Great Eggfly butterfly. When the heat in my area becomes too harsh and makes the area dry, I fly away to a close-by shady, moist area where I feel comfortable. That's how we do Short Distance Migration. LDM route of Blue Tiger butterflies

Hey, I am the Indian Tortoiseshell butterfly. We stay high up in the Himalayan mountains. But when it gets too cold here, we fly down to lower valleys of the Himalayas where it is less cold. If the valleys get too warm, we fly back to mountains. This is how we too, do Short Distance Migration. LDM route of Crimson Rose butterflies



Hey, I am the Red Helen butterfly. I love the dense forests in the mountains of Western Ghats. But when it rains heavily, we temporarily fly down to lower areas of Konkan. And when the rains recede, we may go back to the mountains. That's how we do Short Distance Migration.

Long distance migration (LDM)

Hey. I am the Crimson Rose butterfly. Many of us staying in the southernmost parts of India (eg Kerala) sense the approaching monsoons. This region gets very heavy rainfall which we cannot tolerate. So we start moving northwards, along the Western Ghats. Huge congregations fly over till Karnataka. From here, the journey takes a turn eastwards and reaches the Eastern Ghats. From there, we may cross-over to the Western Ghats using the same route we came from or the journey continues southwards, along the Eastern Ghats, and the congregations come back to the Western Ghats. This long journey is called Long Distance Migration.

Hey do you think that these dainty butterflies can fly such long distances? Here's the secret behind it: The same individuals need not complete the entire journey. On their journey, they roost, they feed, they lay eggs and the new individuals from this next generation continue the journey. Thus, this long, round trip is completed by

Hi. I am the Blue Tiger butterfly. We are seen flying northwards from the southern parts of Maharashtra. To avoid heavy rain, we migrate in large numbers thus doing Long Distance Migration.



DID YOU KNOW THIS? The longest known butterfly migration is by the Painted Lady butterfly. They are known to cover a distance of up to 12,000 kms. Whoa!!

Dispersal migration (DM)

Hello. I am the Emigrant butterfly. Some of us staying in the semi-arid areas of the Deccan plateau are known to do Dispersal Migration. I will tell you what that is.

Emigrants lay many eggs at a time, at the same place. The hungry caterpillars feed voraciously on the plants around and then pupate. But due to this heavy 'grazing', they finish all the food around. The caterpillars haven't even left a few leaves for butterflies to lay eggs. So, as soon as the butterflies emerge from the pupae, they migrate in different directions. This is called Dispersal Migration. When the butterflies find a suitable place, they lay eggs there, ensuring that the emerging caterpillars have adequate food around them.

DID YOU KNOW THIS?

Butterflies are the most studied insects in India. However, their migration continues to fascinate experts and is a much-needed study topic.

Gully-bottoming

Gully-bottoming is an interesting behaviour seen in butterflies. Let's find out what it is... It has been observed that various species of butterflies often gather together at one place. This is a damp, moist and well-shaded place which is chosen by the butterflies to avoid harsh weather. At such places, many butterflies of various species are seen in large congregations. This is called gully-bottoming.

> Many of these individuals could be 'migrants'. And you know what?? With so many butterflies around, there is a high possibility of finding suitable mates. These sites of gullybottoming are 'happening hubs' for match-making. In such areas, if the condition is favourable, the butterflies pair-up and mate, too.



(a) Two butterflies had a fight and decided not to see each other's face again (b) Two butterflies accidentally got stuck together by a drop of super glue (c) The two butterflies are like Siamese twins who are joined together since birth (d) None of the above And the right answer is (d) None of the above. So, what's the right answer?? What ARE these double butterflies? And WHY are they like that? Actually, these 'DOUBLE' butterflies are a mating pair. One of them is a male and the other is a female. Mating is done for reproduction so that the female can lay eggs and there can be many many more beautiful butterflies. This is a very important process for the butterfliesfrom finding a mate to mating. Let's find out more about this. Read on...

Have you ever seen a 'DOUBLE' butterfly? Can you guess what it means?? Your options are:

1 Hill topping

How do butterflies look for their mates? What's better than a hilltop? Some butterflies fly high, over hill tops to get a better view of their surroundings. They can thus, easily locate any females which are flying around. Look at these Great Eggfly males who are hill topping to look for females.







2 Patrolling

Some males perch on a healthy host plant and patiently wait for females to come near. During this time, they drive away other competitor males by chasing them. Check out this alert Blue Pansy butterfly patrolling his territory and chasing away another male.

3 Hair

Males of some species of butterflies, like this Common crow butterfly, have a special way to attract females. They have a brushlike outgrowth at the end of their abdomen which is called hair pencils. They throw open their hair pencils while flying up and down, when they are on a trip to find females. These hair pencils give out pheromones which attract female butterflies. Take a close look

Take a close loo at the hair pencils.

hair pencils

Different butterflies show different ways of doing patrolling.

Some male butterflies keep flying in circles around females. Some males take short flights to scan for females.

Some males are also seen circling around plants with hanging pupae; hoping that female butterflies will emerge from them.

Hair pencils

[©]Dattaprasad Sawant

4 Scent pouch

Males of some species of butterflies have a special scent pouch on the hind wing.



See how the female Striped tiger butterfly touches the scent pouch with her antennae to check out the male.



After various ways of finding and attracting the mate, the male and female butterfly come together to mate. Mating in butterflies is an important process, like in all other living beings, which helps in reproduction.

5

Mating

Mating pairs of butterflies are seen where the male and female butterfly look stuck together back-to-back. They are seen perched on bushes or hanging under leaves. Sometimes, pairs are even seen flying together while mating mid-air.

After successful mating, the female butterfly finds a suitable place and lays her eggs. To know how a new life begins, turn to 米 on page 12.

Great Orange Tip

In case the female butterfly doesn't want to mate with the male, she raises ©Uday Agashe her abdomen to show rejection.



While mating, the male transfers all the collected salts to the female. These salts are gathered by the male while mud-puddling and are helpful to make healthier eggs. Hence, these salts are given as a `wedding gift' to her. 米



The possessive male

In few species like the Apollos and Tawny Coaster, the male does not want to share his female with anyone else. So, he puts a plug to his female after mating. This plug called sphragis doesn't allow the female to mate with anyone else.



This beauty is called the Lacewing. Truly, what a lovely butterfly! Be it with wings wide open or with closed wings. Its colours, its patterrns are sheer beauty! Just like a peice of art painted on canvas. Looks like Mother Nature made it with lots of love.

Let's a take a look at the wide variety of butterfliestheir diversity, their variation, their interesting names and photographs of some commonly seen beautiful butterflies around us.

So many butterflies

OMG... what a beautiful butterfly

©Hemant Ogale

This lovely butterfly is just one masterpiece from the many many artistic creations of Mother Nature. There is so much diversity and variation in butterflies that you'll be amazed.





Butterflies

Colours

Butterflies are most loved for being so bright and colourful. They are like a flying rainbow. Just think of a colour and you are sure to find a butterfly of that colour.

Shapes

If you observe butterflies carefully, you will find them in so many shapes and sizes. Most butterflies fit in common geometrical shapes which you can easily identify. Look at the shapes of these butterflies.



Look closely... One of these leaves is a butterfly— the Blue Oakleaf. Its wings are leaf-shaped and the outer side is brown with a vein-like pattern, so it perfectly looks like a dried leaf. But when the butterfly opens its wings, they are bright blue in colour!

Patterns on wings

Wings, the most attractive part of the butterfly's body, show many different patterns. Check them out...







Nikhil Bhopale

Tails on wings

Some species of butterflies have outgrowths on the edge of their wings. Let's call them 'tails'. See how many types of tails these butterflies have.



Mottled

©Sarvesh Abhyankar





©Nikhil Bhopale



@Milind Pandit



Sword-like

©Mandar Sawant



OMG... so many lovely butterfly pictures on this page!! Don't you feel like actually seeing them flying around you? So, what are you waiting for? Just pack your bags and head straight to the 3 Biodiversity in India where you will get to these beauties. Remember! You have to visit these places in the right season. So read on to plan your next outing to one of these promising butterflying spots.

1) Eastern Himalayas

Eaglenest Wildlife Sanctuary, Talle Wildlife Sanctuary (Arunachal Pradesh) from July to October

2 Indo-Burma

Balpakaram National Park, Baghmara Reserve Forest, Siju Wildlife Sanctuary in Garo Hills (Meghalaya) in October, November or March, April

3 Western Ghats & Srilanka

Tungareshwar Wildlife Sanctuary (Maharashtra), Cotigao Wildlife Sanctuary (Goa), Sharavati Wildlife Sanctuary (Karnataka) from July to October and in February and March.

Same same, yet different!

Same same, yet different! What does it really mean? It's simple! It's called variation. By definition, variation is a different or a distinct form or a version of anything.

In butterflies, it means, that there is difference in size, shape, colour or behaviour

within the same species of butterflies.

It is important to know that there is a lot of variety in size, shape, colour and behaviour in DIFFERENT species of butterflies. But, that's called diversity.

There are 4 major kinds of variations seen in butterflies. Come on, let's take a look.

Geographical Variation

Same species of butterflies look different in different regions. Take a look at these photographs of the Red Pierrot butterfly. One is clicked in the Western Ghats of peninsular India and the other is taken at the Khasi hills in North-east India. Though they are the same species, don't they look different?





Just like these kids... a girl from South India and a boy from north-east. We can make out that they come from two different regions.



Seasonal Variation

When variety is seen within the

SAME species, then it's called

variation. So, never get confused

between 'diversity' and 'variation

Butterflies of some species like the Common Bush Brown show seasonal variation. It is also called Polyphenism. Take a look at the polyphenism in Peacock Pansy butterflies. ©Rohit Girotra



Butterflies which emerge 🚄 during the monsoon are brighter and more attractive while, the ones that emerge in summer have dull colours and patterns on their wings are hardly visible or sometimes missing.

Individual Variation Have you seen siblings and cousins of the same family? They are all similar but actually each one looks different. See these photographs of some Common Emigrants which look similar but are so different.

Sexual Variation

Dimorphism

Take a look at the male and female of the Danaid Eggfly. The female looks very different than the male. When sexual variation has 2 forms. it is called dimorphism. 'Di' means two and 'morphs' mean forms. Hence, dimorphism.





Like there are boys and girls in humans, there are males and females in butterflies. In some species of butterflies, the male and female look identical. But in some species, the male and female look very different from each other and that's called sexual variation!

Polymorphism

As the name suggests, there are multiple morphs of the same species of butterfly, seen in the same area, at the same time. This is best demonstrated by the Common Mormon. Here's how: The female Common Mormon has 3 different forms. Let's call them avataars!



The first avataar looks like the Common Rose. The second avataar is similar to the Crimson Rose. And the third avataar looks like the Common Mormon males.

What's in a name?

The legendary writer Shakespere once wrote "What's in a name?". Hey, but when it comes to butterflies, there are so many interesting stories in a name. Naming a butterfly is an interesting journey. Some butterflies are named after its look, some after the food, some after their flight and so on. Let's sniff out such interesting stories behind names of some butterflies. So... what's in their name?

Their look

The names of some butterflies are just simple and straight. No rocket-science behind naming them!

The wings are yellow in colour and they have orange tips. So, its name is **Yellow Orange Tip**. And the other one is White Orange Tip butterfly.



This one is called the Great Orange Tip as it is the largest amongst all orange tips.

DID YOU KNOW THIS?

This butterfly is named after a character in a French play called 'Pierrot' who painted his face white and wore a blackand-white costume.





This butterfly is called the Giant Red Eye. Now, there are no prizes for guessing the reason behind this name :)

Getting to know the origin or history behind a name is called its 'etymology'.



Their Flyways

Most skippers are named after their flight.

Zip... Zap... Zoom go the Darts. Palm Darts, Grass Darts have a quick darting flight.

Swifts are truly swift flyers and they do complete justice to their names. And there are **Bobs** with a bobbing flight. They are seen with a dipping flight which goes up-and-down. Some other butterflies like the Sailers are also aptly named after their flight. They flap their wings a few times in a quick flicker and then keep them steady to effortlessly float and sail in the air.

Their Food

Butterflies like the Gram Blue. Pea Blue, Guava Blue, Castor, Palmfly, Yamfly are named after the food of its caterpillars.

Caterpillar of the Large Guava Blue pupates inside a guava fruit.

Naming butterflies

Like all plants and animals, butterflies too have 2 names - a common name and a scientific name. You will read these names in the 'photo albums'.

Common name is the one used by enthusiasts; and scientific name is the one used by researchers and experts. The scientific name has 2 parts - genus and species ... it's like having a name and surname... just like we do. Take this one for example:

Common name: Common Jezebel Scientific name: Delias eucharis





Idioms and phrases

Butterflies have flapped their way into literature, too. Take a look at these idioms; each one with a different meaning.

"as gaudy as a butterfly»

That means 'very colourful'. Some super colourful butterflies must have inspired someone to coin this idiom.

⁶⁶ butterflies in the stomach

That means 'feeling nervous'. So when butterflies have exams. do the have 'humans' in their stomach? LOL!

"break a butterfly on a wheel

That means 'to apply unnecessary amount of force to achieve something very simple and insignificant.

Social butterfly

That means 'being friendly'.

It's a butterfly! Or a moth?

When you see a winged beauty fly past your eyes, you might wonder whether it was a butterfly or a moth. And why not? Butterflies and moths do look similar because they are cousins and both belong to the very large group of insects called Lepidoptera. So let's find out how to identify a butterfly and differentiate it from a moth.



Moths are nocturnal. They are active during the night. They are out on moonlit nights when the whole world sleeps.

> Moths have a fat and robust body. Sometimes the body is also furry.

X~

Tussar Silk Moth

Moth

Some moths have thin tapering antennae and some others have fancy, feathery ones.

Moths are usually dull-coloured and drab-looking.

Here's a quick recap

Butterfly

active during day

wings are colourful

body is slim and elongated

antennae are clubbed

Moth

active during night

wings are dull and drab

body is fat and robust

antennae are tapering or hairy

Identifying butterflies

So many butterflies! WHO are they? WHAT are they called? HOW does one identify them? It's simple. Start looking for them. Butterflies are all around us. All you need to do is... start 'butterfly-watching'. It is an interesting activity. Start watching their shapes, sizes and colours. Observe the way they fly and the way they perch. When they come and when they go. What they do and what they don't. You will soon start finding them familiar. Then, try to find out their names. The 'photo albums' from page xx to page xx will help you identify a few commonly-seen butterflies. But, to start identifying butterflies yourself, you will have to first learn to observe them and then, describe them correctly to experts.

Ask yourself these questions

What's the size?

Describing the size of a butterfly can be highly subjective. Hence, we need to give some 'standard' references while describing them.

For example, when I say "I saw a bird which was the size of a sparrow", you get a fair idea of how small the bird was. If I say, "I saw a bird which was roughly the size of an eagle", you can visualise how big the bird was.

Similarly, to describe butterfly sizes correctly, the best way is to compare them to a few commonly-seen butterflies. So, first get yourself familiarised with these commonly-seen species given on this B-scale.

> The **B-scale**

> > Small Grass Jewe

What's a B-scale?

It is a simple scale that tells you the size of a butterfly. This B-scale will help you understand and describe the sizes of various butterflies that you see. Here's how:

First, broadly describe the size of the butterfly you are watching. Small-sized = 12mm to 49mm Medium sized = 50mm to 99mm Large sized = 100mm to 194mm

Then, identify a species shown on the B-scale which your butterfly is closest to, in size. Now go ahead, describe it.

For example: "I saw a medium-sized butterfly which was slightly bigger than the Common Jezebel." Or "I saw a large-sized butterfly, but it was not as big as a Blue Mormon."

small-sized

Common Sailor

Red Pierrot



All butterflies prefer certain habitats and are most likely to be seen there. Noting down the habitat proves to be an important key in identifying a butterfly. So, observe the habitat it was seen in. It could be a forest or a grassland/scrubland or near human settlement.









Common Jezebel

Blue Tiger

2 What's the habitat?

🏴 forest 🖤 grass/scrub 🔜 human settlement

What's the strata?

Is the butterfly flying? If yes, observe the strata. Now, what's strata? Simple! Strata means layers. Here, it means the height at which the butterfly is flying. Some butterflies often fly close to the ground while, some are seen flying higher up.

So, where do you see it flying? Make a note.



What's it feeding on?

Is your butterfly feeding? Watch closely. You already know that butterflies do have food preferences. Certain species will be seen feeding on certain specific foods. These will help in the identification process.

Let's take a look at the icons of the variety of food butterflies feed on.

Indication fruits

animal excreta

mud puddles

O What's its sitting position?

We all have a favourite sitting position, don't we? Similarly, each butterfly also has a specific way to sit. Some sit with wings wide open, while some sit with wings fully closed. Some keep their wings slightly open. Here are a few sitting positions.



💫 partially-open wings 斗 hybrid style

But, here's a catch...

Butterflies don't always sit in the same position. Just like us. When we have to relax, we sit in a particular way... When we have to do yoga, we sit differently... When we have to poop, our sitting style changes.

Ha ha, Interesting, isn't it?

Similary, butterflies sit for various activities like feeding, nectaring, puddling, resting and basking. A butterfly may sit in different positions, depending on the activity it is doing.

Basking is a mighty important activity for butterflies. Hence, they have special 'basking positions' too. Read on to know more.

and why.





Butterflies are 'poikilothermic'. Now, what does that mean? It simply means they cannot regulate their body temperature; like we do.

Let's make it simpler! Even when the atmospheric temperate around us changes, our body continues to be at the same temperature. But that's not the case with butterflies. Butterflies prefer to maintain their body temperature between 30 to 39 degrees. But, their body temperature changes, when the weather around them changes. And that's why they have to regulate their body temperature.

After the cool nights, they have to bask in the Sun to make themselves warm. Just like we do... sun-bathing!

Some species of butterflies vibrate their wings. Just like we rub our hands on a cold winter morning.



6 What's the basking position?



There are seven types of basking positions seen in butterflies. Let's see who does what type of basking

Lateral basking

Some butterflies like the Satyrs have a unique way bathing in the Sun. They sit with wings closed right above their back. And then, they keep tilting left-and-right to make sure that underside of each wing is exposed to the sunlight.

Dorsal basking

Butterflies which do dorsal kind of basking, spread their wings flat to bask in the Sun. In this position, they can warm their body and wings at the same time.

But, with wings spread wide apart, they can be easily spotted and can become a quick meal for their predator. Hence, most dorsally-basking butterflies are brightlycoloured, reminding predators to stay away. They can be unpalatable to most predators.

All photos on this page ©Nikhil Bhopale

Acute basking

Have you ever seen a fashion shoot? There are boys holding shiny, white reflectors to light up the models. Butterflies with white or yellow wings do exactly that, while basking. They hold their wings at an angle to reflect the sunlight and and direct it straight to their body. That's acute basking.

Double acute basking

This is kind of basking is seen only in butterflies like Swifts, Darts, Demons, etc. They have a unique position for basking in which, forewings are held in acute basking position and hindwings are kept in a dorsal basking position. It is an eye-catching pose; so do try to find such double acute basking butterflies.

Appressed basking



This is a peculiar pose seen in Eggflies, Apollos, Maps and Pansies.

'Appress' means to press something close to something else. See carefully... you'll notice that this Map butterfly has pressed its wings downwards such that the tips of the forewings are touching the ground. It looks as if the butterfly is pressing itself close to the ground. Butterflies often take this position when the surrounding is relatively cooler or there is a sudden cloud overcast for some time.

Body basking

This basking behavior is rarely seen in butterflies. In this pose, they keep their wings open with a gap, only as much as their body width. The gap is just enough to allow the sunrays to warm the body of the butterfly. This is seen in two types of butterflies.



Butterflies which usually sit with wings fully closed; sometimes open their wings just enough for body basking.

Butterflies which usually sit flat with wings fully open; sometimes close their wings leaving a gap which is just enough for body basking.

OMG... Give me a break!

When the basking done and the butterflies have warmed their bodies, they don't need any more sunlight. It's time to take a break. That's called Vertical Basking. This is a heat-avoiding posture where the wings are tightly closed over the body, pointing directly at the Sun. Aha! Now, the body of the butterfly is in a cool shade of its wings.



©Nikhil Bhopale

But, don't worry. We have made them simpler for you. Read on to meet the families and their members (that means 'species'). You can find them in the 'photo album' sections.

⊙Kishor Shirkande

It's family time

Families that eat together, stay together

Yes, there's a saying - Families that eat together, stay together! :) But... families? Butterfly families?? You mean Khandaans?? Huh??? Do butterflies really have families? Yes, they do. Just like we do :)

Butterflies are sorted into 6 'families' based on the similarities they have. These families have names, too. But they are not as simple as ours - Joshis, Banerjees, Singhs, Sharmas, Iyers, Khans or D'Souzas. Butterfly families have names like Hesperiidae, Papilionidae, Pieridae, Lycaenidae, Riodinidae and Nymphalidae. Quite a mouthful, right?



