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A DOWN TO EARTH SUPPLEMENT FOR THE YOUNG AND CURIOUS

PIGMENTS OF NATURE

Exhibiting the spellbinding spectacle and play of melanin, the colour for darkness, in our wildlife

Cover Story

The Wildlife of Black-and-White

Rajat Ghai

From the tales of Black Panther to White Tiger and many charming variants, explore how melanin colour codes the wild.

The Dark Brown Pigment—Melanin

Let me start this article with someone whom all of you know: A certain 'Bagheera'. Yes, the 'black panther' from Rudyard Kipling's masterpiece, *The Jungle Book*. In the book, it is Bagheera who teaches the feral boy (or 'man cub') Mowgli about the 'ways of the jungle'.

You may or may not have seen real-life Bagheeras in your city zoo. The first thing that may have struck you on seeing such an animal is the sheer spectacle: A silky black coat that leaves the onlooker in awe.

It is not surprising that colour leaves us spellbound. And in the case of Bagheera(s), we can draw a parallel with ourselves. So many of the eight billion of us who inhabit this planet have dark-coloured skin. For it is the same dark

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Cover Story

brown pigment—melanin—that exists in both us and our non-human counterparts, which is responsible for the colour.

Of course, while a black-coloured animal leaves humans in awe, dark-coloured humans have not always drawn a benevolent response. But the emotive concept of race, based on human skin colour, is not the subject of this piece. So, I leave it at that.

Melanism, the excess amount of melanin in skin, fur, scales and feathers, is a phenomenon seen in mammals, birds, amphibians and reptiles. It is rare in humans (Yes. Many of us may be dark. But only very few are 'truly melanistic', according to scientists).

What causes it? Well, all of you must have studied about genes, right? They are passed from parents to offspring. They contain the information needed to specify physical and biological traits. A 'mutation' can increase the amount of melanin in the skin, fur, scales and feathers.

Some Black-Coloured Animals

Why are some animals black-coloured? Does asking this serve any purpose, you may wonder? It does. Let me give you some examples.

The best instance of melanism is seen in the cat family or felids as the scientists call them. There are almost 40 species of cats, big and small worldwide. They range from the Siberian tiger to your own neighbourhood tabby.

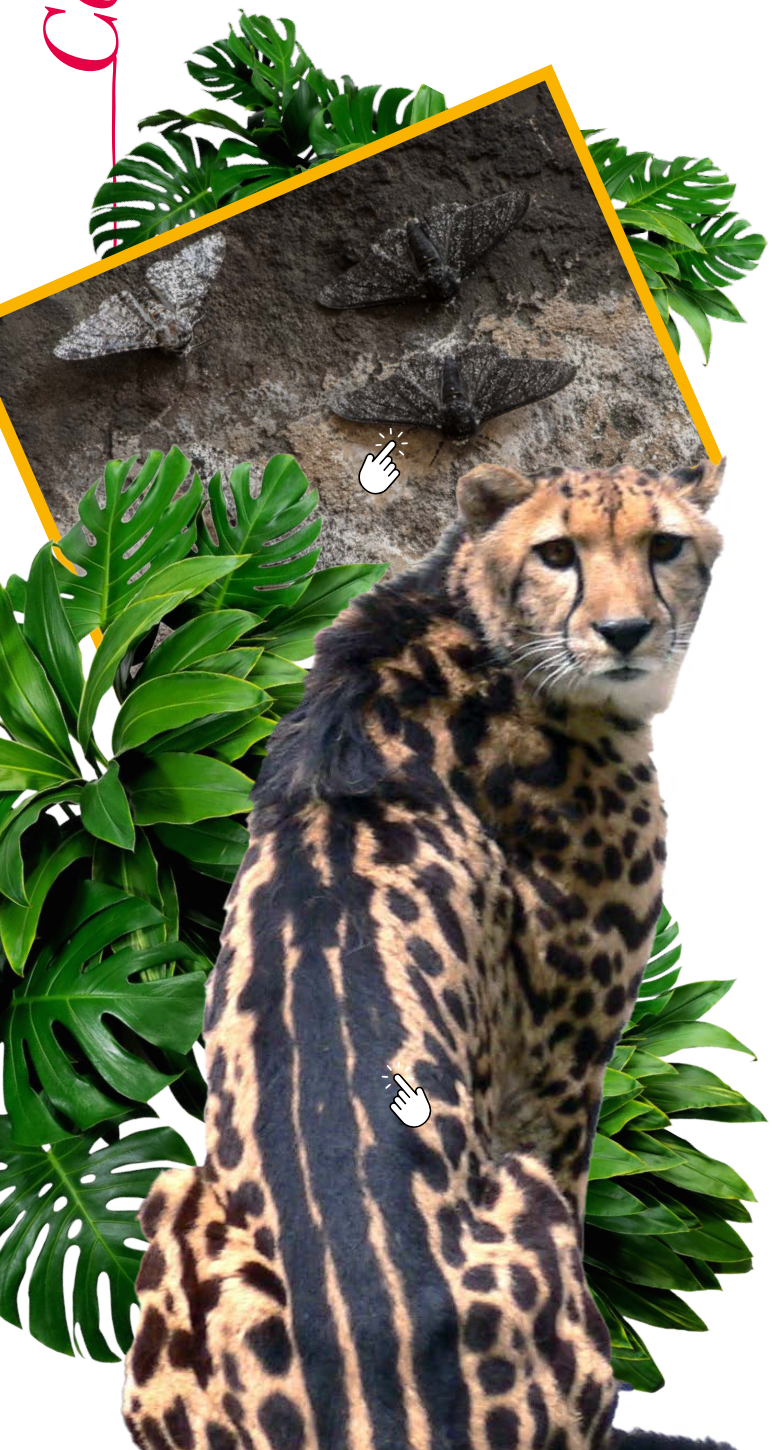
The dark brown pigment, melanin, that exists in both us and our non-human counterparts, is responsible for our colour. Melanism, the excess amount of melanin in skin, is seen in animals but is rare in humans.

I started with Bagheera, the **'black panther'**. (Click the hand icon next to each animal's picture to know more about it!) A black panther is actually a variant of both a leopard and a jaguar, who has a gene mutation that causes melanin to cover its rosettes. But even then, "These can be seen at an angle in the bright sun," wrote Kipling for Bagheera. And since in his imagination the Bagheera belonged to Central India, literally speaking, it should be considered only as a mutation of the Indian Leopard because jaguars are not found in our country at all.

Scientific studies tell us that leopards evolved to be melanistic in thick humid jungle habitats, where such a coat would help hide them and aid them in hunting. A leopard in more open country

Cover Story

An albino animal or human usually has white skin, fur, feathers but reddish-pink eyes. Leucistic animals, on the other hand, may appear white. But their eyes are normal coloured.



is unlikely to have a black coat. It is all about natural selection. Hail, Charles Darwin!

But the leopard, which is found in Asia and Africa, is not the only cat that shows melanism. The **jaguar** does it too. This felid, the third biggest in the cat family after the tiger and lion, is found in the Americas—from Mexico to Argentina. The melanistic jaguar, in some form or the other, was a prominent deity for the Aztec, Maya, Inca and other indigenous American people.

Melanism has been seen in two other big cats also. **Bengal tigers** in India's very own Similipal Tiger Reserve (STR) in Odisha exhibit an increased amount of black colour on their coats.

According to Lala A K Singh, an expert on STR's black tigers, the cats were officially recorded for the first time in the forests of Similipal during 1975–76. That is when forest officials, along with two foreign tourists, saw two full-grown black tigers on the road leading to the Matughar meadow on a bright winter day, according to a report in *Gobar Times*' parent publication, *Down To Earth* (DTE).

Odisha plans to open a safari for these majestic animals. But more on that later.

The **African Cheetah** also shows melanism in case of some individuals, which are called 'King Cheetah'. Again, it is not a separate species. In fact, cheetahs and tigers are only partially melanistic or 'pseudo melanistic'. Only leopards and jaguars are fully or 'truly melanistic'.

Besides cats, one of the other most well-known instances of melanism is found in the **pepper moth** of England.

You may remember the Industrial Revolution, having studied about James Watt and his steam engine? Now let me tell you a backstory about it.

The pepper moth usually had light coloured wing patterns. This provided them with effective camouflage. But when the Industrial Revolution began, the spike in the use of coal led to deposition of soot everywhere in England. The light moths began to be increasingly predated upon by birds.

It is then that, according to scientists, the moths evolved completely black coloured wings. This strategy paid off. The black moths were now indistinguishable from their new surroundings and hence would not be visible as easily to their predators. Scientists have called this phenomenon as 'industrial melanism'.

Having covered mammals and insects, let me come to birds next. The best instance of a melanistic bird from India is the **Kadaknath poultry breed.** You may have come across media

reports about this unique breed of chicken that originates in Jhabua, Madhya Pradesh.

It is completely black in colour—comb, wattle, beak and feathers. Even its flesh is black due to the presence of melanin. But don't worry. The meat is thought to be more nutritious than the ordinary broiler you may eat. Indeed, the Government of India is supporting programmes to help Adivasis breed Kadaknath and help their local economies.

The **Silkie** from China and **Ayam Cemani** from Indonesia are similar to the Kadaknath in that they exhibit melanism as well. Check out their photos on the net.

A Colourless phenomenon—Albinism and Leucism

Melanistic animals may leave you in awe. But it is not the only genes-based colour phenomenon in the animal kingdom. There is also albinism and leucism.

Now what are these? You may have heard about albinism before. There are albino humans too. Simply put, albinism is the loss of melanism from the human body. An albino animal or human usually has white skin, fur, feathers. Their eyes are usually reddish-pink as the absence of pigment causes the retina's red blood vessels to be reflected.

Leucism, on the other hand, is the partial loss of pigmentation in animals. Such animals may appear white. But their eyes are normal coloured.

Leaving a Colourful Impression

What does this deep dive into the colours of the natural world tell us? For one, it shows us how animals have evolved over millennia to develop features—as in melanism—that help them make best use of their habitat.

The Odisha government's decision to setup a safari for STR's black tigers evoked mixed responses from conservationists. Some lauded the move. Displaying such rare animals to tourists would create awareness about them and aid in their conservation, Singh told DTE. Others, though, were critical. We should let such beautiful, rare animals range free in the wild, their home.

While the jury is still out on this, one thing is for sure: Colour, whether in humans or animals, does leave an impression. It is Nature, that greatest of crafts persons, at its best. We humans are nothing before it. That should give us lessons in humility. Wouldn't you agree?

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Do-It-Yourself

Sandhya

Kutki Payassam

A lip-smacking dessert of little millets for followers of a healthy, wealthy, and wise living.

As the name suggests, 'little millet' is among the smallest of all millets. Commonly known as *kutki*, it is locally called by various names: *kuri, sama, saamalu,* or *gajro*. It is considered a great rice-substitute and is grown in many parts of India. A drought-resistant crop, it can be cultivated even under extreme conditions. It is rich in protein, fat, carbohydrate, flavonoids, and antioxidants, and can protect us from diabetes, cancer, and gastrointestinal diseases. So, let's try our hand at a delicious recipe of little millets.

Preparation time: 30 minutes
To serve: 2 persons

Ingredients:

- **Overnight water-soaked little millets:** 1 cup
- **Ghee:** 1 tbsp
- **Milk:** 1 litre
- **Sugar:** ½ cup
- **Cashew–almond paste:** 1 tbsp
- **Cardamom powder:** ½ tsp
- **Chopped cashews, almonds, pistachios, and other nuts:** 2 tbsp
- **Saffron:** 7–8 threads

Procedure:

- Heat a pan on a low-medium flame. Put some ghee and add little millets. Roast these millets for 4–5 minutes until they become dry.
- Add milk and stir well. Let the milk boil, condense, and reduce to about half litres.
- Add sugar and stir the mixture continuously. Add the cashew–almond paste too.
- Add cardamom powder in the end and serve the pudding.
- Sprinkle some finely chopped nuts and saffron for garnish.

Your *kutki payassam* is now ready to eat! Feast upon this tasty kheer with your friends and family and bask under the sweet compliments you'd receive for your healthy choice.

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Readers-Writers

On a Waste Management Odyssey

Suhani Sharma

From trash mountains to waste segregation, a high-schoolers research and observation through the dump yards.

The garbage mountains along the Yamuna, reminded me of the dystopian scenes from the movie *Idiocracy* (2006), in which people living in the shadows of such mountains get buried under an avalanche of trash. Hence, I embarked upon a quest to explore solutions to such colossal challenges and this journey took me the sites in and around my city, Chandigarh.

Since 2019, I was associated with door-to-door campaigns for waste segregation in Mohali. Awarded as the Cleanest City in Punjab in 2023, I delved into this strategy of sorting waste at its origin. That demonstrated to me the possibility of successfully implementing sustainable solutions—like composting, recycling, and generating Refuse Derived Fuel (RDF). However, despite legal subsidies, challenges still lay in institutionalizing source segregation—in maintaining the momentum for its campaigns and preventing relapses of households into mixed waste disposal.

In 2022–23, I undertook a case study in Ludhiana's Tazpur dumping ground which hosts about 40 lakh tonnes of legacy waste. The bioremediation process implemented there, involved bio-mining machines that sift through waste and use it to produce bio-soil, inerts, and RDF. However, the struggle to find viable markets for these products and the groundwater contamination due to the landfill site highlighted to me the hurdles that lay in converting dump yards into valuable assets.

Finally, in 2023, I studied the market perspective of waste management during my internship with Sustainability Accelerator. It was an online internship launched by CBSE in collaboration with the industry partner, Aditya Birla Fashion and Retail Limited, and a UN-accredited non-profit, 1M1B. This program shifted my focus from treating source segregation as a 'public good' to a private one.

Segregation, though a cost-effective and practical means of waste management, requires constant campaigning. So, I proposed that we undertake measures that make it a lifestyle practise. Like, through color-coded dustbins, incentivizing waste generators and collectors, and building a commodity chain beyond high-value items. Implementing a tiered reward system based on quantity and purity of segregated waste can also empower waste collectors and make their waste market-ready. Leveraging Extended Producer Responsibility (EPR) for low-value dry waste, like thin polythene bags, presents a clear opportunity for pursuing waste-segregation privately in households. Financial incentives can resolve issues of proper disposal.

With EPR implementation, smart data analysis, integrative market schemes, and public sensitization programmes, our garbage mountains can be transformed. 'Segregate as you generate' has to be the way of life for generations to come.

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Waste segregation is mandated in several states in India. But most of the plastic waste ends up in landfills instead of being recycled as barely 30 per cent of it is sorted correctly. Hence, the need of the hour is to educate people about segregating, composting, and recycling waste through aggressive awareness programs by community and self-help groups. So, don't be a foolish donkey and dispose of your waste properly.

Ritika Bohra/GT