



COVER STORY

BANANAS!

PEELING BACK THE HISTORY, BIOLOGY AND FUTURE OF THE WORLD'S FAVOURITE FRUIT

How did the banana go from a rather inconspicuous plant tucked away in Southeast Asia 7000 years ago to today becoming the world's most popular fruit grown in over 135 countries? The humble yellow fruit you likely had for breakfast or at lunch today has a complex story involving exploitation, genetics and disease.



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BANANA BIOLOGY

One of the first misconceptions of bananas is that they grow on trees - they are not woody, but in fact the world's largest herb. Both bananas and plantains belong to the Musaceae family and are thought to have been first domesticated in Papua New Guinea. As with many of the foods we are accustomed to today, the ancestral type looked very different. Many of the wild bananas are about the size of your thumb, filled with unpalatable black seeds and some are self-peeling. These features are of course useful to propagate seeds but not ideal for human consumption.

Fast forward to today, and just one commercial banana exists – the Cavendish (out of over a thousand varieties). The Cavendish came into existence in the 1830s in a small greenhouse in Chatsworth House. The head gardener Joseph Paxton had received a containment of banana plants from Mauritius which survived and flowered. Paxton named these bananas *Musa cavendishii* after his employer, the Duke - William George Spencer Cavendish. Missionaries then transported the Cavendish to Samoa and South Sea Islands. Over time, through selective breeding and natural genetic mutations, the Cavendish banana became a seedless, sterile triploid variety.

BANANA BACKUP

It wasn't until more than a century later that the Cavendish would become the saviour of the global banana industry. Prior to this, we were cultivating another banana variety for export – Gros Michel, affectionally known as 'Big Mike'. It was ideal for export as it had a thick peel, resistant to bruising and had a pleasant taste. The banana industry was growing rapidly and to keep up with the demand for bananas, the fruit was grown in neat rows as part of large monoculture plantations. Like the Cavendish, Gros Michel is sterile. Bananas were propagated by taking banana offshoots (corms) from the mother plant and planting them nearby. This meant whole plantations contained banana plants with near identical genetics. Big Mike's

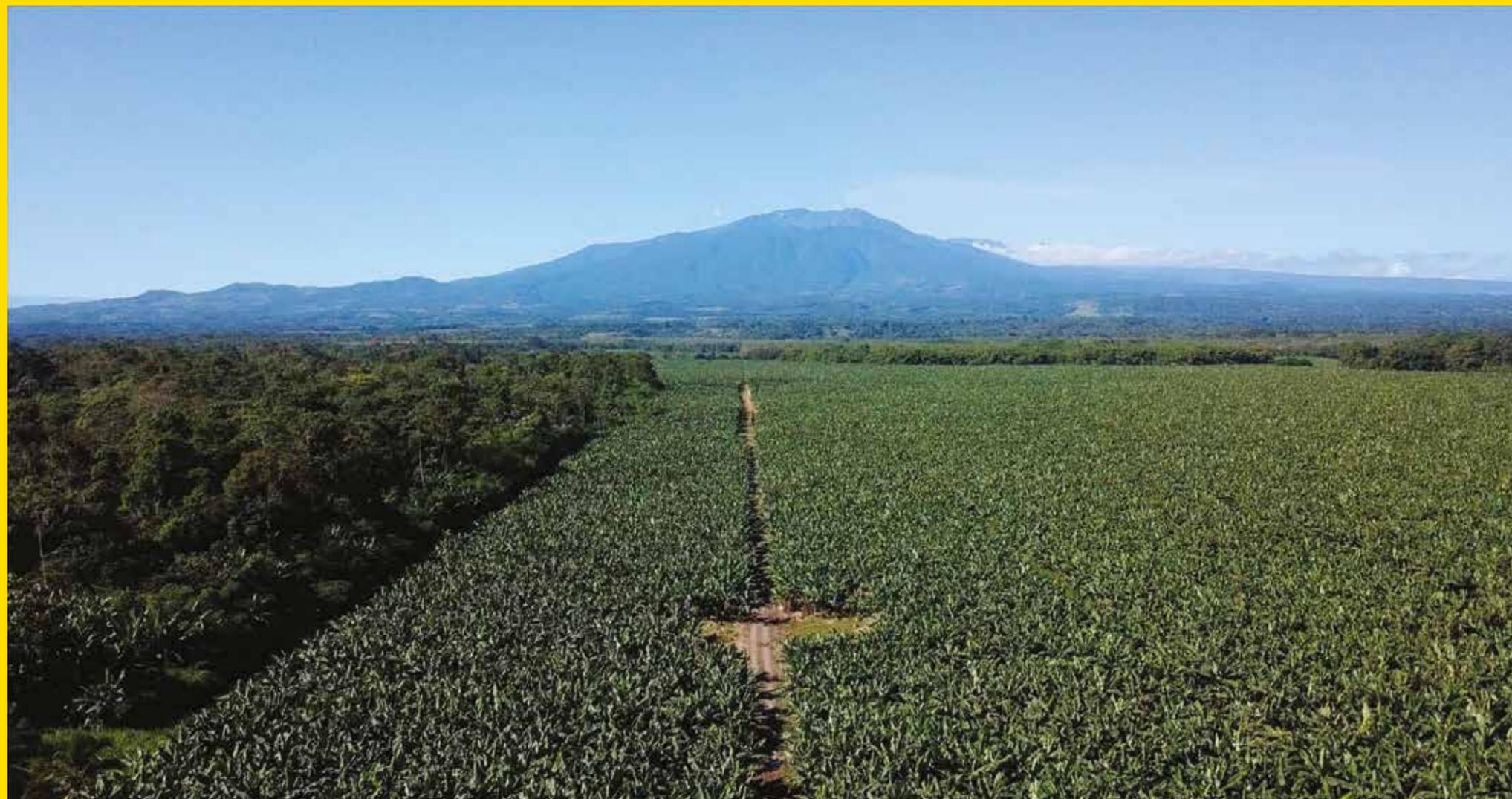
demise came in the form of a highly destructive fungal disease – Tropical Race 1 or Fusarium wilt. The disease affected the plant's water transportation system, causing the banana leaves to wilt and die. The nature of banana production methods (essentially a large number of banana clones in close proximity) further compounded the problem, as the bananas had little-to-no disease resistance. The fungal disease spread quickly and raised plantations to the ground across Latin America. The multinational banana corporations then made the switch to Cavendish, as this was a suitable replacement that showed disease resistance and fulfilled other export criteria.

WITH POPULARITY COME PROBLEMS

More than 60 years on, and banana growing practices remain largely the same. Bananas continue to grow in popularity and as a planet we consume over a 100 billion bananas every year. Part of this popularity comes from the cheap price we pay at the supermarket checkout. In Europe and North America, the price per kilo of bananas is far less than other fruits such as apples and oranges, despite the fact that bananas are grown, harvested by hand and transported great distances from the tropics. This is possible due to the economic efficiencies of monoculture production. However, there are social and ecological costs to this low price.

The intensification of a single crop has also meant a concentration of pests and diseases. To manage this, a cocktail of chemicals (fungicides, herbicides and insecticides) are regularly sprayed onto plantations using crop dusters. In addition to this, fertilisers are applied to the shallow soils, where frequent heavy tropical rains mean the topsoil is washed away. Further to the aerial application of agrichemicals, bananas bunches are grown in perforated plastic bags impregnated with yet more chemicals to preserve the integrity of the fruit. The high concentrations of these chemicals in the proximity of plantations has negative effects for nearby wildlife, freshwater habitats and soil quality.

Banana monoculture, Costa Rica



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Banana agroforestry

The harm from these agrichemicals also extends to plantation workers. Numerous studies have shown higher rates of cancers, sterility and other health complications amongst workers. This has been in part due to them having inadequate protective equipment or training when applying the chemicals. Some agrichemicals such as DBCP were widely used to kill nematodes in the soil despite its known toxicity to human health. In addition, many of these workers employed by big multinationals live and work on the plantations, leading to further exposure. There have been numerous legal disputes for compensation between plantation workers and several of the multinational corporations over health issues resulting from the use of the chemicals.

Today, the banana industry is at a crossroads. Where once the Cavendish was the saviour, there is now have a case of déjà vu. A new strain of the fungal disease (Tropical Race 4) is devastating banana plantations. The disease was first identified in Taiwan in the early 1990's and has been steadily spreading across Asia, Australia and parts of East Africa. This year it reached Colombia. This is of major concern, as Latin America represents the largest banana exporting region, with around 60% share of the market (exporting value). Further disease spread puts at risk the livelihoods of producers and workers and there appears to be no chemical that can kill this soil-borne fungus. This also represents a worldwide food security issue, as about 1 in 20 people around the world rely on bananas as a major source of calories or income.

UNCERTAIN FUTURE

Solutions to the banana crisis are being sought through means of genetically engineering new banana varieties. This is of course a challenge as bananas have no seeds to work with due to their sterility. Some in the sector view this as a sticking plaster to the issues faced by the industry and are in favour of restructuring the production system towards smaller-scale agroforestry systems with other exporting banana varieties on offer.

The Cavendish banana turned from a small greenhouse project 200 years ago into a multibillion-dollar industry employing thousands of people. The Achilles heel of the banana sector: banana clones grown in monocultures, needs to be addressed in order for bananas to have a fruitful future

THE BANANAGEDDON FILM PROJECT

Sara is part of The Bananageddon Film project, which aims to document the socio-political, economic and ecological issues around banana production. The team is made up of seven ecologists who met in 2016 whilst completing masters at Imperial College London. The team conducted over 45 interviews in Costa Rica, Colombia, UK and the Netherlands with people across the banana supply chain from plantation workers, indigenous small-scale producers, economists, fair trade advocates and ecologists. The film is currently in post-production with a tentative release date in late 2020. *