

Travelling companions

Whether by accident or design, plants have accompanied people on many historical migrations. It is of little wonder then, that the history of humanity is recorded in the plants whose polysaccharides, proteins and oils keep us alive.

Domestication of crops and animals, which started more than 10,000 years ago, was needed for the transition from nomadic, hunter-gatherer groups to small settlements, and later, villages, towns and cities. This process happened independently in many places throughout the populated world. The farming practiced by these now-sedentary people enabled a well-fed social elite to spend time thinking and developing new breakthrough technologies such as writing, mathematics and even science.

However, human civilisations have never been wholly settled. People have frequently had to move, whether forced by changes in climate causing intense periods of flooding (as happened to the coastal civilizations of Peru) or drought (the American 'Dust Bowl'), by disease (the potato famine in Ireland), by war and conflict, or just by humankind's inherent wandering spirit. Whatever the reason, our favourite crops always travelled with us. Today, we can see the genetic footprints of these enforced or voluntary migrations; the common journey of plants and people has left traces written in their DNA.

In a recent issue of *Nature Plants*, van Andel and colleagues¹ told the tragic history of the Maroon inhabitants of Suriname through the crops they grow. These populations are descendants of African slaves, taken from their homeland only a few centuries ago to work on plantations in the Americas, growing cash crops, such as sugar cane, cotton and tobacco. Some slaves escaped and formed independent communities, hidden in the rainforest, across the Caribbean and South America. The genetic analysis of rice cultivated by these isolated populations indicates that it is of African origin, just like the people who grow it. The authors found a Dutch ship's logbook documenting the fact that human slaves were not the only cargo taken to the New World. African rice grains were also part of the trip, with some leftovers being cultivated by the co-transported slaves in their small subsistence gardens.

This is but one example of plant genetics informing historians. In an article published in our very first issue, da Fonseca and colleagues² analysed the genome of

archaeological samples of domesticated maize from several thousand years ago. By comparing these with both modern versions of the crop and the ancestral teosinte, the authors could trace back the diffusion routes of maize from southern Mexico to the southwest of what is now the United States of America. This journey followed two distinct paths, initially through the highlands and later by a Pacific coastal route. All the while, the domestication of corn continued, and several traits were selected to adapt the crop not only to the arid climate, but also to human cultural tastes for sweeter grains.

A few months ago, Crowther and colleagues published a study³ in *PNAS* focusing on archaeobotanical samples, dating back from the eighth to tenth centuries, of ancient plants present in Madagascar and the Comoros. Despite the islands' proximity to the African coast, the majority of identifiable crop remains were of plants from Southeast Asia (rice, mungbean, cotton) and not Africa (sorghum, millet, cowpea). This pattern strongly suggests an early colonization by settlers from Southeast Asia and Austronesia, thousands of kilometres away, who came with their crops in tow. This is physical support for theories derived from megafaunal extinctions and human genetic, cultural and linguistic studies that lack more classical archaeological clues.

There are many more examples of plants and humans travelling together, for the best and sometimes for the worse, that a full book would be needed to cite them all (and a good start could be 'Fifty Plants that Changed the Course of History' by Bill Laws⁴). The end of the fifteenth century saw European and American crops follow the marches of the Spanish conquistadors, and later Portuguese, English, Dutch, French and other explorers, traders and colonists. Maize, potato, tomato, vanilla and cacao were transplanted from their Mesoamerican, Amazonian or Andean areas of origin within galleons also bearing silver and gold extracted from mines with the forced 'help' of enslaved natives chewing coca leaves, another crop with a history that continues to range from the proud to the tragic. Apple, banana, coffee, wheat and rice travelled the other way.

From antiquity to the Middle Ages, the vast network of trade routes from Asia to Europe, known as the Silk Road, allowed movement of caravans loaded with grains and spices (pepper, cinnamon, nutmeg, ginger, cloves, saffron, coriander and more). Silk itself started to be produced in Europe once silkworm eggs and seeds of their favourite food, the white mulberry, were smuggled out of Asia by Byzantine monks in the sixth century, breaking the Chinese monopoly on production.

In a similar vein, seeds of the rubber tree (for which we recently published a high-quality sequence⁵) were smuggled out of the Amazonian forests by English explorer Henry Wickham in 1876. He sent the seeds to Kew Gardens, from where they were used to start more efficient production in the British colonies of Asia. Soybean, one of the most important crops today, was cultivated widely in Asia until Dutch traders introduced it to Europe in the seventeenth century, once again following the major trade routes of the time: crops and people travelling together once more.

Even today, plants continue to travel with us, often as stowaways, along our worldwide rapid transportation networks. Invasive plants and weeds transform our local ecosystems, sometimes for the worse. Plants have been shaping the history of human beings as our essential companions during our migrations and wanderings. Given the looming menaces of overpopulation and climate change, they are also fundamental components of our future as we search for ways to feed all of our grandchildren. Developing better crops is one of the crucial keys to unlock a sustainable future for this planet's population. Only then will we be able to share voyages with our favourite plants for centuries to come; perhaps even to Mars and beyond, with a bag of potatoes in the holds of our spaceships. □

References

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