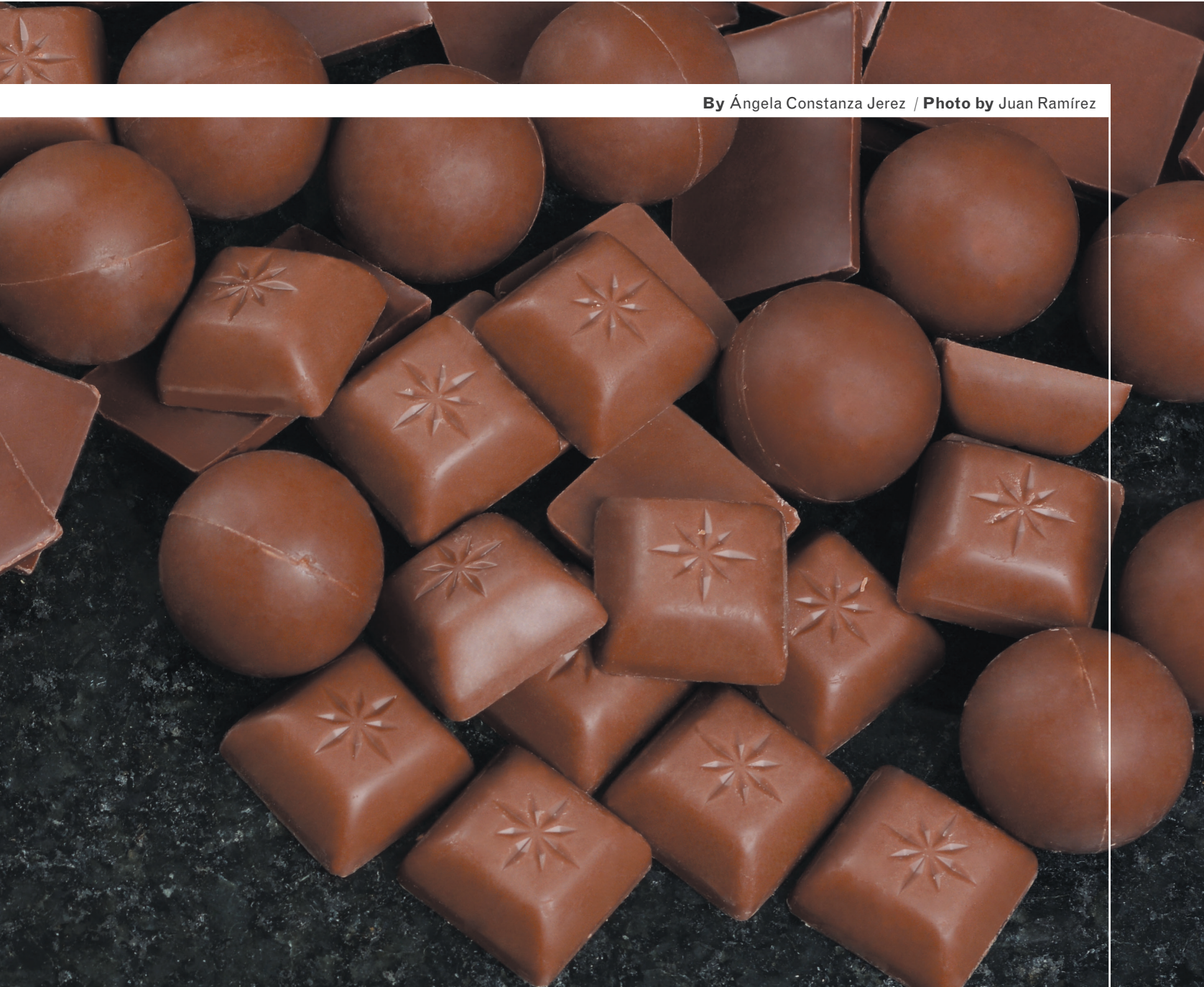


THE WORLD WANTS CACAO





In an attempt to highlight the importance of tropical forests, a group of researchers from different institutions and universities, including El Rosario, analyzed the evolutionary history of several plant families. Cacao, a product used by mankind for thousands of years, was one of them. Its booming consumption today makes it a symbol of industrial potential.

Torrential rains, long dry seasons, strong winds, earth tremors, hurricanes... Climatic and geological events relentlessly challenge the species that inhabit the earth, requiring them to adapt or disappear, and providing powerful evidence for natural selection.

“Knowledge of evolutionary history helps us understand how plants have adapted to climate change in the past and predict how they might adapt to the anthropogenic shifts that we are seeing today and will see in the future,” says James Richardson, biology professor at the Universidad del Rosario.

Richardson worked with an international group of researchers in establishing that the species *Theobroma cacao* has existed for 10 million years. In its natural distribution, cacao is restricted to low tropical forested wetlands; never in all that time has it adapted to dry areas, and if the climate becomes even drier, native populations of the species could be threatened.

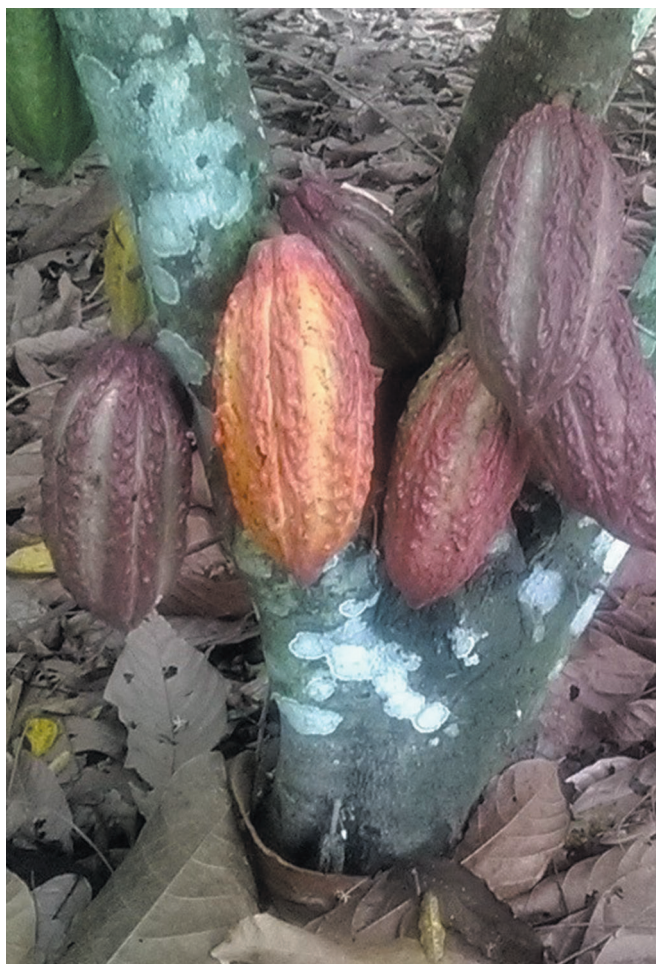
In a 2016 letter sent to the journal *Science* and other prestigious academic publications, several scientists from the Universidad del Rosario, including Richardson, sought to alert the government, businesses, researchers, and the world in general to Colombia's potential risks and opportunities in the post-conflict period. The letter pointed out that "Colombia is a center of diversity for the *Theobroma* genus to which cacao belongs. The country probably boasts a significant genetic diversity for cacao that can help improve the chocolate industry, bring forth varieties that resist disease, boost productivity, maintain resilience in the face of climate change, and introduce new flavor profiles. The continued use of this natural resource can be supported by working to preserve the forests where they are found."

They asked readers to reimagine the color of Colombia's wealth as "green" rather than gold. Biological resources can be protected if their economic, social, and ecological value can be demonstrated. Meanwhile, the extent of the wealth of the chocolate industry, whose raw material is cacao, has been quantified and is currently valued as a market worth 100 billion dollars per year.

CACAO CONSUMPTION IS INCREASING

According to the study conducted by the research group, including scientists from the Universidad de los Andes, the University of Miami, the National Clonal Germplasm Repository, and the Royal Botanic Garden Edinburgh, demand for cacao has increased at a rate of 2.5% annually, allowing a deficit forecast of 150,000 tons of cacao in 2020, the greatest in 50 years. This is because countries like China and India are consuming more chocolate, so much that authorities such as the International Cocoa Organization report an increase of 30,000 tons of chocolate consumption between 2010 and 2014 in China. Another reason for the anticipated deficit is the appearance of fungi such as "witches broom" and moniliasis, which have decimated plantations in Africa and South America.

The situation has improved in Colombia, however. According to the National Federation of Cacao Producers (Fedecacao), production continues to increase despite the phenomena of La Niña and El Niño.



← Colombia's cacao is genetically quite diverse, which can probably contribute to improving the industry by supplying disease-resistant varieties.



← Professor James Richardson of the Faculty of Natural Sciences and Mathematics participated in the international research group that found the species *Theobroma cacao* to be 10 million years old.



“Cacao production in Colombia increased by 3.6% in 2016 from 54,798 to 56,785 tons, setting a new record for production in the country,” announced Eduard Baquero López, director of the Federation.

This increase was slower, however, than in 2014-2015, when it increased from 47,732 to 54,798 tons. It was also a slower rate of growth than in 2012-2013, when it increased from 41,670 to 46,739 tons. As a matter of fact, exports decreased from 13,744 tons in 2015 to 10,572 tons in 2016. “This decrease was basically due to lower international prices for the bean, which meant that international sales were not very profitable. It should also be mentioned, however, that imports were also reduced from 5,391 to 4,423 tons in those years thanks to increased domestic production and industry interest in acquiring Colombian beans,” said the Federation. Fedecacao exports in the two most recent years included sales to countries such as Malaysia and Estonia, as well as to traditional markets such as Spain, Belgium, and Mexico.

THE FUTURE IS PROMISING IF PRODUCTION IS SUSTAINABLE

Richardson says that both his findings from studying cacao and the current commercial outlook point to a clear opportunity for developing the industry, “but it is important

**COLOMBIA HAS
THE SECOND
LARGEST NUMBER
OF *THEOBROMA*
SPECIES IN
THE WORLD,
SURPASSED ONLY
BY BRAZIL**

A MILLENNARIAN PLANT

In the forest, the cacao tree can reach a height of 9 meters. But trees that size are impractical for the process used to produce cocoa powder. For this reason, the plants used in the chocolate industry are under 3 meters high.

Each cacao fruit contains between 20 and 40 seeds that are fermented, dried, and toasted. Then they are separated from their shells and milled to be turned into cocoa butter, liquor, or solids.

that it be done in a sustainable fashion, not at the expense of tropical forests, which hold the biological diversity that could improve crops and production.”

He further explains that after 10 million years of evolution, the cacao tree has very strong ecological ties to other plants and animals in its environment, which maintains the genetic diversity of the species. This is an important factor for cacao in its natural environment if we are to benefit from current and future diversity.

Richardson and his colleagues also studied the evolutionary history of other plant families and species to provide the basic foundation of knowledge for sciences to find clues to ways to preserve the tropical forest with its native species, its unspoiled ecosystems, and its wealth of natural life.

“Along with colleagues from the Royal Botanic Garden of Edinburgh,” explains the professor, “we began to plan ways to call attention to the importance of preserving tropical forests, putting the cacao tree into this picture through its economic importance. We worked simultaneously with several families of trees such as Sapotaceae, chicle, and ginger, as well as some ornamental plants including the begonia. We reconstructed their history, their interspecies relations, their taxonomy, morphology, and physiology. Although these families are not as relevant in economic terms, they are ecologically important.” ■