

Food for thought: Crop diversity is dying

By Elisabeth Rosenthal International Herald Tribune

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ROME José Esquinas-Alcázar regards the corn laid out in rows with the love and admiration that sommeliers reserve for bottles in a fine wine cellar. To the untrained eye, it is a collection of misshapen ears: Long, short, blue, yellow, white, spotted, covered in dirt.

"Look at this beauty!" he exclaims. "Some are good for starch, some for popcorn. Some grow in the cold. Some are good fried, some broiled. The taste for each is completely different.

"Diversity is what makes us happy, gives us choice and keeps us free. And it's tragic because this is what we are losing."

Esquinas, a top official at the UN Food and Agriculture Organization in Rome, has spent decades campaigning to preserve plants that are used for food, which are becoming extinct at an alarming rate.

Last year, his efforts culminated in the adoption of the United Nations Treaty on Plant Genetic Resources for Food and Agriculture, which requires countries to preserve existing crops and creates an international system for sharing crops and plant genes.

But much has already been lost.

Historically, humans utilized more than 7,000 plant species to meet their basic food needs, Esquinas says. Today, due to the limitations of modern large-scale, mechanized farming, only 150 plant species are under cultivation, and the majority of humans live on only 12 plant species, according to research by the Food and Agriculture Organization.

Most types of food, for example the tomato, consist of several different species, and each species may contain dozens, if not hundreds, of varieties. In the last century, dozens of varieties of corn, wheat and potato have disappeared.

"This is not nearly as sexy as a panda going extinct, but the losses are far more dangerous for our survival," Esquinas said in his office on the outskirts of Rome.

The result for humans is a more one-dimensional diet, where tomatoes look and taste the same and only one type of corn or potato may be available on supermarket shelves.

The consequences are potentially dire: As species drop out, the world loses the genetic diversity that has allowed farmers and scientists to breed new types of seed crops that can adapt to changing conditions - a hotter, drier growing season, for example, or the invasion of a new bacterial pest.

"If you have climate change or environmental change, you need to search through those plants to find one that is adapted to the new conditions," he said.

The loss of food plant species is directly related to the 20th century "green revolution," in which farmers adopted streamlined agricultural techniques to increase production of food. To maximize crop yields, they chose a few high-yield, uniform crops that grew predictably and could be planted and harvested mechanically. With irrigation, mechanization, fertilizers and pesticides at their disposal, farmers in developed nations were able to maintain control over growing conditions.

The result was plentiful food, but far less variety in the types of seeds and foods planted - which, occasionally, led to disastrous vulnerability. In 1970, for example, more than half of the corn crop in the southern United States succumbed to an unusual fungus because the corn was all grown from one seed type that is particularly susceptible to that disease.

While modern farmers tend to favor a few crops, traditional small-scale farmers took the opposite approach: maintaining and growing a wide variety of crops and seeds in order to survive, since they had little control over things like soil, weather, and pests. To ensure there was food on the table, their best bet was to plant a range of crops - some that thrived in heat and others that could withstand cold, for example.

Their storehouses and fields were (and are) the world's gold mine of plant genetic resources. Indeed, after the unusual fungus damaged the U.S. corn crop in 1970, scientists modified the U.S. corn seed with a gene borrowed from a type of African maize that was resistant to the fungus.

But this kind of resource is being lost as land is urbanized and as traditional farming practices in Latin America and Africa fall by the wayside.

Esquinas ticks off crops that have disappeared from the world's fields: Of the nearly 8,000 varieties of apple that grew in the United States at the turn of the century, more than 95 percent no longer exist. In Mexico, only 20 percent of the corn types recorded in 1930 can now be found. Only 10 percent of the 10,000 wheat varieties grown in China in 1949 remain in use.

Paying homage to the bounty and variety of nature has been a lifelong obsession for Esquinas, who grew up in a Spanish family that had farmed for generations. In the late 1960s, he did his doctoral research on genetic diversity of the Spanish melon, traveling by bus, foot and horse to collect 370 varieties of seed from small farmers all over Spain.

Later, he grew the fruits and characterized the physical and chemical differences between melon types, creating a melon family tree.

More recently, at the anthropological museum in Cairo, he focused on a particular treasure from the tomb of King Tut, one that other tourists might have overlooked among the precious trinkets and gold: a small partitioned box holding more than 25 varieties of barley seed, each in its own compartment.

"They recognized that these seeds were a treasure," Esquinas says. "My conclusion as a plant geneticist is that he was buried with all these seeds because he didn't know what kind of soil and humidity or rain there would be in the underworld!"

Today, Esquinas's mission is to ensure that food plants are protected, both in "banks" and in the field, so that the bounty of nature - and the genetic diversity behind it - is preserved.

Since many crops have already disappeared in the West, farmers in the developing world must be compensated for maintaining and sharing their plant varieties, he says.

When Esquinas was collecting melon seeds, he accompanied a farmer to a remote village by donkey, where he was presented with seeds for a melon that the farmer insisted was exceptionally hearty.

When he analyzed the seed back in the lab, he discovered that it was resistant to many diseases, and genes from that melon have since been introduced into numerous commercial fruits.

Various institutes and universities around the world maintain seed collections. The French National Institute for Agricultural Research, for example, maintains 4,000 lines of maize. But Esquinas says that a more systematic effort is needed.

Maintaining diversity in food is not just about survival, but also about the quality of life, and people must be taught to appreciate it, he said.

In the past two decades, "People have learned to drink wine - to notice the distinctions: this one is smoky or sweet and that one aromatic," he said. "But all food has variety - rice has it, potatoes have it. You don't know a good wine the first time you drink. We need to develop our taste for foods like these, too."

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