

# Spreading seeds by human migration

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A sampling of the diversity of corn found in Southern California urban gardens.  
Credit: J. Heraty

Using DNA collected from corn grown by immigrant farmers in Los Angeles and Riverside, researchers at the University of California,

Riverside have found the genetic diversity of corn in some home and community gardens in Southern California far exceeds levels found in commercially available seeds.

The researchers cautioned that this is a preliminary study with a small sample size. Future research would expand to include a greater number of gardens, and focus on characteristics of the corn, such as tolerance to drought, difference in cob size and flowering time.

The research addresses the importance of maintaining a diverse range of genetic resources for future crop improvement. A broad mix of genetic material is useful for breeding modern improved lines, minimizing the vulnerability of inbred crops to pathogens and pests, improving performance and incorporating unique traits.

Yet, crop genetic diversity is threatened in developing and developed countries as policies and program encourage the use of relatively homogeneous modern cultivars and as people migrate from farms to cities, often abandoning farming altogether.

"As genetic diversity erodes, we stand on a chair with shaky legs," said Norman C. Ellstrand, a professor of genetics at UC Riverside and co-author of the paper, "Maize Germplasm Conservation in Southern California's Urban Gardens: Introduced Diversity Beyond *ex situ* and *in situ* Management," was published online in the journal *Economic Botany*.

Ellstrand, who is also a member of UC Riverside's Institute for Integrative Genome Biology and interim director of the university's new "broad-sense" agriculture institute, CAFÉ (California Agriculture and Food Enterprise), co-authored the paper with Joanne Heraty, a former UC Davis graduate student who Ellstrand supervised. She is now a project manager for the Yolo County Resource Conservation District.

In 2008, the researchers collected corn samples from home gardens and community gardens in Los Angeles and Riverside. They genetically compared the garden populations to five commercially available varieties of corn that included two horticultural varieties, two industrial varieties used in large scale agricultural crop plantings and one bulk bin variety purchased from Big Saver Foods supermarket in Riverside. They included the supermarket variety because farmers indicated that local ethnic markets were sometimes a source of seed for their gardens.

Southern California is an ideal location to study joint human and plant migration because immigrants from Mexico and Central America frequently maintain plots of crops from their homelands in home gardens and community gardens.

Past research has shown that corn genetic diversity is being eroded, particularly in Mexico and conservation strategies tend to fall into two categories: *ex situ* and *in situ*. *Ex situ* refers to using a controlled environment, such as a gene bank or botanical garden, to maintain [genetic resources](#). *In situ* refers to a farmer-based approach via traditional agricultural practices like seed saving and selective breeding.

Ellstrand and Heraty describe home and [community gardens](#) in Southern California as providing a third method, which combines *ex situ* and *in situ* methods of conservation and is aided by human migration.

"People collect baseball cards and people collect plant seeds," Ellstrand said. "In reality, it is not all that surprising that as people move around they help preserve the [genetic diversity](#) of plants."

**More information:** Joanne M. Heraty et al. Maize Germplasm Conservation in Southern California's Urban Gardens: Introduced Diversity Beyond *ex situ* and *in situ* Management, *Economic Botany* (2016). [DOI: 10.1007/s12231-016-9333-3](https://doi.org/10.1007/s12231-016-9333-3)

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