

PROJECT FACT SHEET

Development of Bean Seed Stocks



FUNDING FARMER INNOVATION

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AREA 6: Biological Diversity

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PROJECT BASICS

Duration: Two years (2003-2004)
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FARM/RANCH PROFILE

Richard Ortez operates El Sueño Enterprises, a small “seed to table” diversified agribusiness in Payne County, Oklahoma. El Sueño Enterprises consists of El Sueño Garden, where Ortez grows vegetables, beans, and grains, and a commercial processing kitchen (“Boarding House Classics” brand). Ortez sells his products at a local farmers' market. All of the value-added products that Ortez sells have at least one ingredient from his farm.

PROJECT OBJECTIVES

The original objective of this project was to develop non cross-pollinated seed from several varieties of the “common bean” (*Phaseolus vulgaris*). Ortez selected beans as the test species because: 1) he grew and used a lot of them in his business, and 2) it was theoretically one of the easiest species to work with.

“That proved to be a much more ambitious goal than first imagined, one that would require years to develop, and then end up generating a totally different business model than I current follow - or prefer,” he says.

However, in the process of reaching that conclusion, Ortez recognized the possibilities inherent in saving small amounts of seed from several crops that he already grows commercially. In the process, he hopes to improve yields by selecting for sub-varieties better adapted to the conditions of his farm. Both outcomes would make his operation more sustainable, and thereby improve its bottom line.

PROJECT DESCRIPTION

Ortez suspected that many of the seeds he buys were not genetically true - a suspicion strengthened by his work on this project, as he personally confronted the challenge of maintaining genetic purity in open-pollinated varieties (see box).

In theory, Ortez says, beans require a separation between varieties of only 15-20 feet to prevent cross-pollination because they are self-pollinating. In practice, maintaining that separation proved more complicated.

“Two plots of beans separated by twice that distance or more can become cross-contaminated with the first rain storm that washes seed from one plot into the other,” Ortez says.

“Or, by a crow dropping a seed picked up in one plot into another (these could be hundreds of feet apart). Or, by one residual seed germinating from a previous bean crop grown in that plot.”

“In each case we have violated the 15-20 foot requirement, and just one plant of a different variety growing up in the middle of a plot renders the whole plot potentially cross-pollinated and unsuitable as genetically true seed.”

“Because most bean plants look alike, there is usually no way to identify the offending plant(s) by appearances and removing them before they mature. If the seeds of the two varieties look different, you might learn of the contamination after you harvest the seed and find white seed amongst your black ones, but that is too late - the damage is done. Further, in the case of two black-seeded varieties you may never even know.”

All of this made the idea of growing dozens of different bean varieties on the same farm seem less and less



Richard Ortez

feasible. However, that is precisely what Ortez' business model - selling a large variety of products to a relatively small number of customers - requires.

“The only way to grow genetically true bean seed would be to grow a single variety in any given year and to use ground on which beans had not been grown for at least three years,” Ortez explains.

“While this is something I could do, it would require larger plots to be profitable, and selling the seed from

Open-, Cross-, and Self-Pollination, and Hybrids

“Cross-pollination” is used in two senses. In the first sense, it refers to the transfer of pollen from one plant to a different plant of the same species or variety. In this sense, cross-pollination is contrasted to “self-pollination,” which is the transfer of pollen within the same flower, or from one flower to another on the same plant.

The second sense of “cross-pollination” refers to the deliberate transfer of pollen by a human

agent from a plant of one variety to a plant of a different variety. This is the means by which hybrid varieties are created, in an effort to incorporate good qualities of each parent variety into a single variety. This second sense of “cross pollination” contrasts with “open pollination,” in which pollen is transferred between parents of the same variety, generating offspring that resemble the parent plants.

larger plots would require a totally different marketing strategy than has been adopted for my business, and one that does not appeal to me.”

PROJECT RESULTS

Meanwhile, more successful efforts at saving seed from crops other than beans began to suggest a new direction for the project.

Peppers are another high-demand crop for Ortez' operation, and while he generally gets good yields, one variety in particular - Poblano, also known as Ancho when dried - proved troublesome.

“These peppers should be the size of a good fist, but mine were more like husked walnuts - and not many of them, either,” he says.

He began saving and replanting the seeds from his better Poblano plants.

“It seems to have worked,” he reports. “Within just a couple years I began getting quite reasonable yields of decent sized peppers.”

“Even this is not so straightforward, because I have yet to recover seed from the original source and grow them in a controlled study with my saved seed. But it does look promising.”

With that success, Ortez reoriented his project goals toward developing personal lines of open-pollinated varieties for all the crops he grows commercially.

Peppers

He has already made further progress with another pepper variety, recovering a variety of jalapeño more similar to a traditional variety that he had grown before, but different from those currently available from most seed companies.

Even saving seed for personal use is not without its difficulties, Ortez cautions. For example, peppers can

self-pollinate, but they are also readily cross-pollinated by insects such as flies. As a result, different varieties must be separated by at least 400-500 feet - which ended up putting Ortez' crops too far from his irrigation water source to prevent losses.

However, since peppers yield many more seeds per plant than beans, they require much less space, making the caging of individual varieties viable as a solution. Ortez plans to cage the 21 plants saved back from his 2010 garden (the three best plants of seven pepper varieties). By using cages, he can put all 21 plants in a single row with an irrigation line. (As perennials, peppers can be overwintered indoors, and set back out in the garden the following year for seed production.)

Cabbage

Ortez' operation also uses a great deal of cabbage. In his early days of commercial gardening, he was often frustrated that a seed company would discontinue a hybrid variety soon after he identified it as one well suited to his farm's conditions.

He has now begun to select for open-pollinated varieties of cabbage that do well in his operation, bypassing the need for hybrids altogether.

The 2010 season brought two promising developments in this work. First, his search for open-pollinated cabbage varieties yielded several that he had not previously been aware of.

Second, five plants from the 2009 crop survived the winter and produced harvestable seed crops. Though he does not know the variety, seed planted from them in his 2011 garden is doing well.

“Interestingly,” he says, “this seed came from small heads produced on the stumps of previously harvested plants. This means that I can actually use the cabbage to assess its qualities and still get seed from the stalk left behind.”

Beets

Ortez' operation requires him to pickle large quantities of beets. Like cabbage, beets are biennial, requiring an overwintering period before producing seed. Since they do not survive Oklahoma winters, though, they must be harvested, stored over winter, and set back out in the spring.

Ortez has found this process challenging, since he grows beets as a spring crop, and beet roots tend to spoil even in refrigeration due to the long storage period. Growing the beets as a fall crop would reduce the storage time from nine months to five.

However, starting fall crops in the extreme heat of late Oklahoma summer presents yet another challenge. In 2011, Ortez plans to try shade cloth as a means of improving establishment of his fall beet crop.

Beans - again

Despite the obstacles he encountered with developing dried beans for sale as seed, Ortez is still interested in saving seed from the crop.

"I plan to plant only one variety of bean in any given year, and to plant it in a well-isolated plot on which beans have not been grown for at least three years," he says.

Ortez estimates that the bean plots, which will average about 1/10 acre, should produce 200-300 pounds of dry edible beans, which he will use both as a commercial crop and as seed in future years.

"While I could not legally sell such seed as 'garden seed,' I could make it available to local gardeners on a gratis basis, something I have no issues with," he says.

"This will provide return on investment by increasing the quantity and quality of my commercial crops," he says.

RESOURCES

For his work on saving seed from his own crops, Ortez relied heavily on *Seed to Seed*, by Suzanne Ashworth.

"It is very straightforward in anticipating the problems encountered with cross-pollination, and in outlining techniques for overcoming them," he says.

Another widely cited source on garden-scale seed saving is *Breed Your Own Vegetable Varieties*, by Carol Deppe. (Deppe's more recent book, *The Resilient Gardener*, also addresses strategies for growing multiple dry bean varieties under limited isolation distances.)

SAVING SEED

A few words about why saving your own seed is a good idea, and worth the extra effort required:

- It makes you less dependent on commercial seed suppliers and their legal control over your crop.
- It greatly curtails the inadvertent introduction of diseases from external seed sources.
- It allows for selection of sub-varieties that are better adapted to specific soil and climate conditions.

The yields may not be as great as hybrids, but for a small business such as mine that is less critical than these other issues.

- Richard Ortez