



Planning and Growing a 3 Sisters Garden:

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Who are the 3 Sisters?

Companion plantings of nutritious crops that complement each other in their growth habits and nutritional components.

Corn	Beans	Squash
Upright with firm root system, tall support for climbing beans.	Absorb atmospheric N and release it in the soil, making it available to corn and squash.	Broad leaves shade and cool the soil, help retain moisture, deter weeds; prickly vines deter pests.
Species <i>Zea mays</i> , family <i>Poaceae</i> Taino name: <i>mahiz</i> , what Columbus heard in the West Indies. Domesticated from <i>teosinte</i> in Mexico 9-10,000 yrs ago. Teosinte=short & bushy, maize=single tall stalk w/leaves. 500-1000 kernels/stalk, each kernel is a genetic sibling. Corn genome contains more genes than the human genome.	Species <i>Phaseolus vulgaris</i> , family <i>Fabaceae</i> , 1 of 5 species domesticated ~4000 yrs ago by pre-Columbian peoples. 70 wild species native to the Americas. Dry beans: Old World varieties like fava, New World varieties like pinto. Now cultivated in temperate, semi-tropical, and tropical regions worldwide.	Species <i>Cucurbita pepo</i> , family <i>Cucurbitaceae</i> domesticated in southern Mexico 8-10,000 yrs ago. Hundreds of subspecies and cultivars. Gourds were domesticated in Africa.

Sunflowers are the potential 4th sister, to attract bees and hummingbirds for pollination.

Nutritional components

- Corn = carbs, beans = protein, squash = vitamins
- Amino acids compose the proteins humans require.
- Humans require 21 amino acids: 10 synthesized on our own, 11 come from our diet. Meat and eggs contain all 11, beans and grains do not.
- All our metabolic processes require niacin (amino acid); without it, we get pellagra.
- Corn has carbs, lacks niacin and tryptophan.
- Beans provide niacin, tryptophan, and lysine.
- Squash provides niacin and vitamin C.
- Corn treated with alkali makes its niacin available; when processed with lime it adds calcium to the diet.
- Squash provides fiber; ground corn is also used to create beverages.

Location, location, location

3 sisters require a minimum of 8 hours of sunlight each day.

- Avoid overhanging trees, shrubs, structures.
- N-S orientation provides the best exposure.
- Locate close to water for drip irrigation.

- Plan for the corn mounds to be 12-18 inches wide, 2 to 3 feet apart, straight line or zig-zag.
- Corn roots can grow 10 to 30 inches deep.

Planting: feed the soil first

- Remove weeds, rocks, grass. If planting directly in the ground, first loosen and amend the soil as needed.
- In winter, plant a legume cover crop like fava beans to add nitrogen to the soil, then cut them down when they begin to flower. Compost the cut stalks or use them as mulch.
- Dig 3-4 inches of compost into the soil.
- Invest in liquid fish fertilizer.

Typical 3 sisters include dent corn for drying and grinding into corn meal, such as Hopi Blue, Earth-tone dent, and Glass Gem. Some varieties, such as Martian Jewel, can be picked early for eating or left to dry for grinding. Sweet corn varieties include Golden Bantam and Silver Queen. What do you want to eat and how do you want to eat it?

- Soil temp should be at least 60-65 F.
- Make wide “soup bowl” mounds about 5 ft apart on center.
- Plant 5-6 seedlings, or kernels, 2” deep in a 10-12 inch circle.
- Cover seedlings with berry baskets or crop cover, water, protect from birds.
- Be careful not to pull seedlings when pulling weeds.
- When corn is ~6” tall, plant beans or bean seedlings ~3” from corn, seeds 2” deep. Water and cover with berry baskets to protect seedlings from birds.
- When beans have true leaves, make ~12” wide squash mounds on the perimeter of

corn and beans. Plant 4-5 squash seeds, 2” deep, in a circle in each mound. Cover, water, protect from birds.

Cultivation

- Dig in compost to enrich the soil, spread mulch to suppress weeds and hold in moisture.
- Pick off squash bugs.
- Water the soil, not the plants. Weed, weed, weed!
- Train beans on the corn stalks, train squash around everything to shade and cool the soil.
- Fertilize with dilute fish fertilizer every two weeks.

Harvest

- BE PATIENT.
- Green pole beans = 50-60 days
- Dry shell beans = longer, wait until shell is dry.
- Sweet corn = 60-100 days
- Dent corn = 90 days and longer, wait until the ears of corn droop away from the stalk. Test kernels with your fingernail. Getting dried kernels off the cobs takes some effort. Works best when kernels are VERY dry and a little bit loose.
- Make sure dent corn kernels are VERY dry before grinding them. Sift the ground corn to separate the hard germ from the meal. The corn germ makes great polenta.
- Winter squash and pumpkins = 90-115 days. Wait for thick rind, hollow thump, dry stem.
- Enjoy what you have grown!

References

- Foster, Nelson, and Cordell, Linda S. 1992.
Chilies to Chocolate: Food The Americas Gave the World. University of Arizona Press.
- Fussell, Betty. 1992.
The Story of Corn. University of New Mexico Press.
- Filmer, Ann. Maize Genetics May Show How Crops Adapt to Climate Change. 2016.
<https://www.universityofcalifornia.edu/news/maize-genetics-may-show-how-crops-adapt-climate-change>
- Vegetable planting chart
<http://mgsantaclara.ucanr.edu/garden-help/vegetables/vegetable-planting-chart>

University of California Cooperative Extension (UCCE) Master Gardener Program of Santa Clara County

- Volunteers trained by UC.
- Help desk for gardening advice M-F, 9:30am – 12:30pm at mgscchelpdesk.zohodesk.com
- Website: mgsantaclara.ucanr.edu
- Sign up for monthly email with gardening tips.
- Demonstration & research gardens.
- Integrated Pest Management
www.ipm.ucdavis.edu
- Talks, classes, demos, Spring and Fall Garden Markets.
- MG growing grounds and greenhouses at Martial Cottle Park.
- South County Teaching and Demonstration Garden at 80 Highland Ave., San Martin, next to the animal shelter.