

Seed Propagation, Transplanting & Storage

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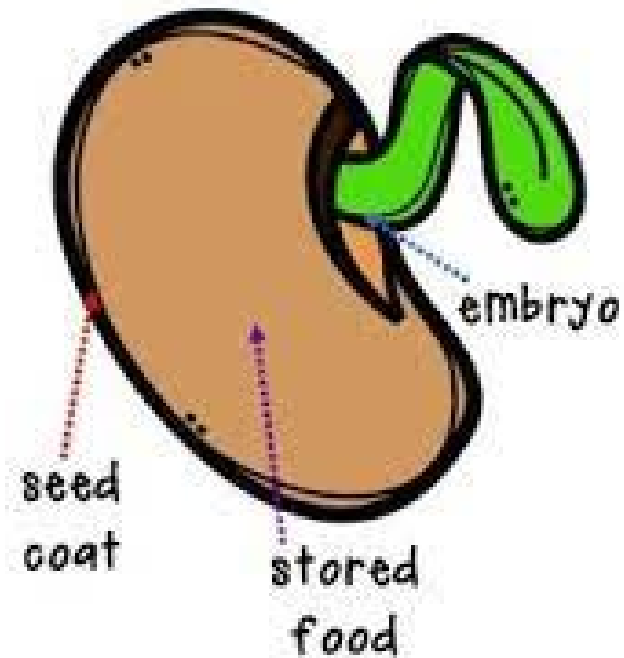


Creator: RomoloTavani | Credit: Getty Images/iStockphoto

Parts of a Seed

- Outer seed coat
- Endosperm
- Embryo

Parts of a Seed



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Seed Propagation

- Growing from seed usually is the most economical and satisfactory method of plant propagation
- Find reputable suppliers of high-quality seed
- Choose varieties or cultivars adapted to your area



Hybrid vs. Open Pollenated

Hybrid

- Cost is higher
- Harder to find
- More vigor
- More uniformity
- Greater disease resistance

Open Pollenated

- Cost is more economical
- Easier to obtain
- Less uniformity
- Ability to save seed

New Mexico Seed Law

- Truth-In-Labeling protects consumers
- Regulates agricultural and vegetable seeds sold in the state
- Keeps noxious weed seeds out of public distribution



Type	Planting Depth	Thin to	Sun/Shade	Days to Germination	Maturity
Annual	1/4"	4"	Sun/Partial Shade	7-10 Days	45 Days
Direct Sow			Start Indoors		
After Danger of Frost			4 Weeks Before Last Frost		

440 6

<https://nmdeptag.nmsu.edu/media/pdf/nm-seed-law.pdf>

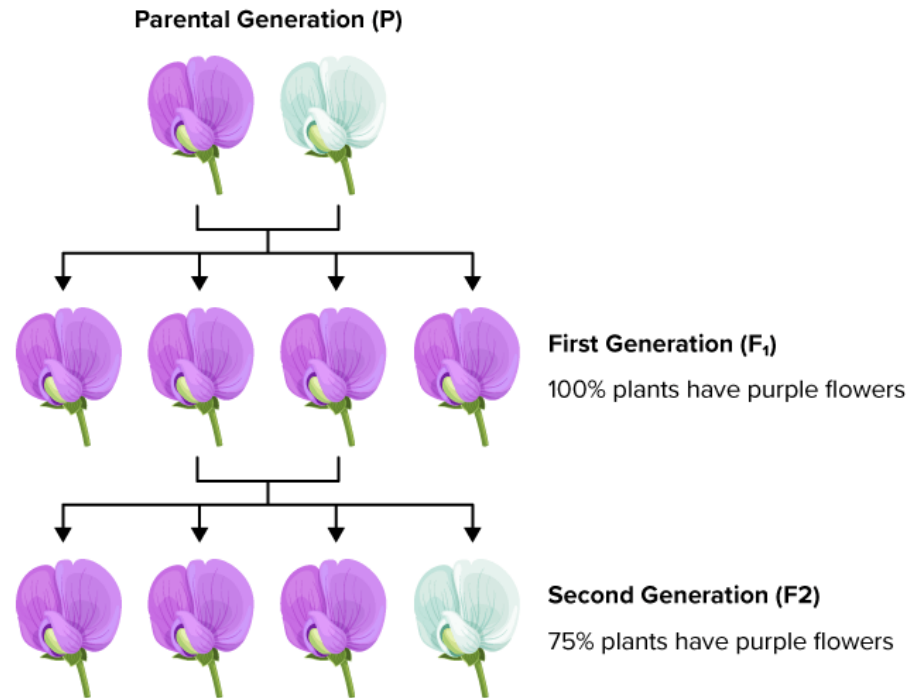
Seed Storage

- Cool
- No humidity
- Airtight containers



Saving Your Own Seed

- Cross-pollination
- F1 generation
- Hybrid seed



Saving Your Own Seed

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An Effective Plant Field Cage to Increase the Production of Genetically Pure Chile (*Capsicum* spp.) Seed

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Additional index words: pepper, plant breeding, pollination

Chile (*Capsicum annuum* L.) plants are considered a self-pollinating crop (Allard, 1960); however, out-crossing rates (7% to 91%) recorded by several investigators suggest that *Capsicum* is a facultative cross-pollinating species in field research (Francoschetti, 1971; Odland and Porter, 1941; Tanksley, 1984). Although the amount of out-crossing varied among the investigations, it was sufficient to impede progress in breeding programs (Odland and Porter, 1941; Tanksley, 1984). The out-crossing is associated with natural insect pollinators, not rain or wind (Odland and Porter, 1941; Tanksley, 1984). The amount of cross-pollination affects the precautions needed to produce seed and the breeding methodologies used by the plant breeder.

Natural pollination such as insects must be excluded to ensure self-pollination. To produce large amounts of genetically pure seed, seed certification programs have isolation requirements to control pollination (New Mexico Crop Improvement Association, 1992). Isolation distances range from 1.6 km for foundation seed to 0.4 km for certified seed. Breeding programs also require isolation during seed production. Thus, space for isolation becomes limited.

To ensure self-pollination, a simple and effective plant isolation cage was needed. This paper describes such an enclosure (Fig. 1).

The cage consists of nylon fabric draped on a frame constructed of conduit piping (Fig. 1A). A 3.05-m section of 19-mm-diameter galvanized electrical conduit pipe is bent in two places, making two "legs," each 1.22 m long (Fig. 1B). The cage netting material is a white polyester fabric (NKKF, Apex Mills, New York). A green fabric has been used successfully. With either color, no effects on plant growth, fruit set, or seed production have been observed in the southern New Mexico climate. The fabric is 1.73 m wide and comes

in 61-m rolls. Fabric mesh size has a count of 20 × 16 holes/2.5 cm². This mesh effectively excludes pollinating insects from the cage. A 18.3-m length of fabric is sufficient to house at least 60 *Capsicum* plants, an amount that is acceptable to maintain the genetic diversity of *Capsicum* germplasm (Ellis et al., 1985). Two fabric sheets are sewn together (two short sides and one long side) with nylon thread. In the field, the fabric is slid over one of the pipe frames and a second pipe frame is placed inside the cage at the opposite end (Fig. 1B). The fabric is pulled to make the cage snug (Fig. 1C). Additional pipe frames may be placed at intervals inside the cage, as required, to support the fabric. To control aphids (*Myzus* spp.), insecticides may be necessary. A tractor-powered sprayer is used to spray the insecticide through the fabric onto the plants. It is not necessary to anchor the cages with soil. Even though New Mexico has strong winds, the fabric is heavy enough to lay flat on the ground without soil mounded on the edges. At the end of the season, the cage is washed and stored for the next season.

This type of cage is being used to increase and evaluate portions of the U.S. Dept. of Agriculture *Capsicum* germplasm accession and breeding stocks of the New Mexico chile breeding program. Plants in the cages have produced sufficient seed for several *Capsicum* species—*Capsicum annuum*, *C. chinense* Jacq., *C. frutescens* L., and *C. pubescens* L.

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Fig. 1. Plant field cages for chile (*Capsicum* spp.) seed production being positioned in a field in southern New Mexico. (A) Conduit pipe frame being placed in the field, (B) fabric being draped over conduit pipe and the final frame being placed, and (C) finished cages in place with the fabric draped to the soil.



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Germination

- Types of containers
- Types of seedling mixes
- Planting depth
- Temperature
- Moisture
- Light
- Oxygen



Types of Containers

- Single Cell Inserts
- Seedling Flats
- Individual small pots
- Grow for at least 3-4 weeks in its starter container



Types of Media

- Fine
- Lots of Choices
- DIY Recipe
 - 4 parts compost
 - 1 part vermiculite
 - 1 part perlite
 - 2 parts peat



Planting Depth

- 2-3 times the width of the seed
- Some require light and shouldn't be covered at all
- Some are very tiny and only a dusting of peat is sufficient



Temperature

- Check variety requirements
- 65°F – 75°F
- One of the most crucial factors



Moisture

- Imbibition
- Adequate and continuous
- Once imbibition starts a dry period will kill the embryo



Light

- Some varieties require light, other require dark
- Seed packets generally have this information
- Might require supplemental lighting
- A broad spectrum grow light is best



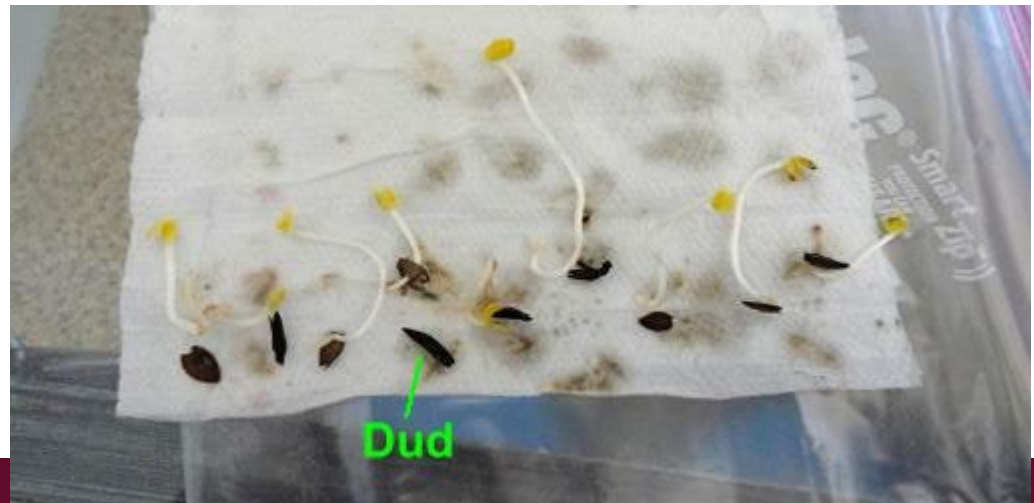
Oxygen

- Respiration increases during germination
- Media should be well aerated
- Don't over-saturate



Pre-germination

- Reduces time to emergence
- Temperature and moisture are easy to control
- Higher germ rates



Hard to Germinate Seeds

Scarification & Stratification

- **TSP** - 113.4 g TSP powder to 4 liters water and soak for 30 minutes – found in paint section of hardware or home improvement stores
- **Bleach** - 10% bleach solution and soak seed for 10 minutes
- **Gibberellic Acid** – 250-500 ppm GA for 30 minutes – found in garden centers



Starting Seeds Indoors – Things to Consider

- Where will they be planted?
- How long is germination?
- How long to reach full maturity?
- What is your indoor set up?



Transplanting

- When to transplant – are they going to larger containers or directly to the garden?



Transplanting

- Hardening off – best in shade house or cold frame for a 1-2 week period



Transplanting

- Final transplant or transplanting to the garden plots





Reputable Seed Companies

Park Seed – www.parkseed.com

Burpee – www.burpee.com

Stokes Seed – www.stokeseeds.com

Johnny's Selected Seeds – www.johnnyseeds.com

Territorial Seed Company – www.territoralseed.com

Harris Seeds – www.harriseseeds.com

Baker Creek – www.rareseeds.com

NMSU CPI Spring Plant Sale

- April 20 & 21

Transplants of many varieties of chile pepper, tomato, eggplant, tomatillo, squash and herbs.



Thank you!