# Seed Saving: Why and How

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# Seed Saving - Outline

- History
- Why save seeds?
- Types of seeds
- Pollination and Pollination challenges
- Steps to harvest, clean, and store seeds
- Longevity of saved seeds
- Resources,
- final thoughts

# Spiritual origin: The Purpose of Seed

(Gen 1:11-13-NIV)

- Then God said, "Let the land produce vegetation: seed-bearing plants and trees on the land that bear fruit with seed in it, according to their various kinds." And it was so
- 12 The land produced vegetation: plants bearing seed according to their kinds and trees bearing fruit with seed in it according to their kinds. And God saw that it was good.
- 13 And there was evening, and there was morning — the third day. 29 Then God said, "I give you every seed-bearing plant on the face of the whole earth and every tree that has fruit with seed in it. They will be yours for food. (Gen 1:29-NIV)

# History of seed companies

- **1854** - farmer (or gardener) exchange, on-farm seed saving
- **150 years ago** - no seed saving companies in the world!
- **1866** – first commercial seed produced, cabbage, Long Island NY
- **1945** – hybrid techniques led to growth of regional seed companies –

**1945** – THE GREEN REVOLUTION – arsenic chemicals – used to kill insects---most chemicals were researched and used in agriculture

- **Today** – company consolidations: 10 seed companies account for 67% of the global proprietary seed market.

# SEED GROWING- WHERE DOES IT START?

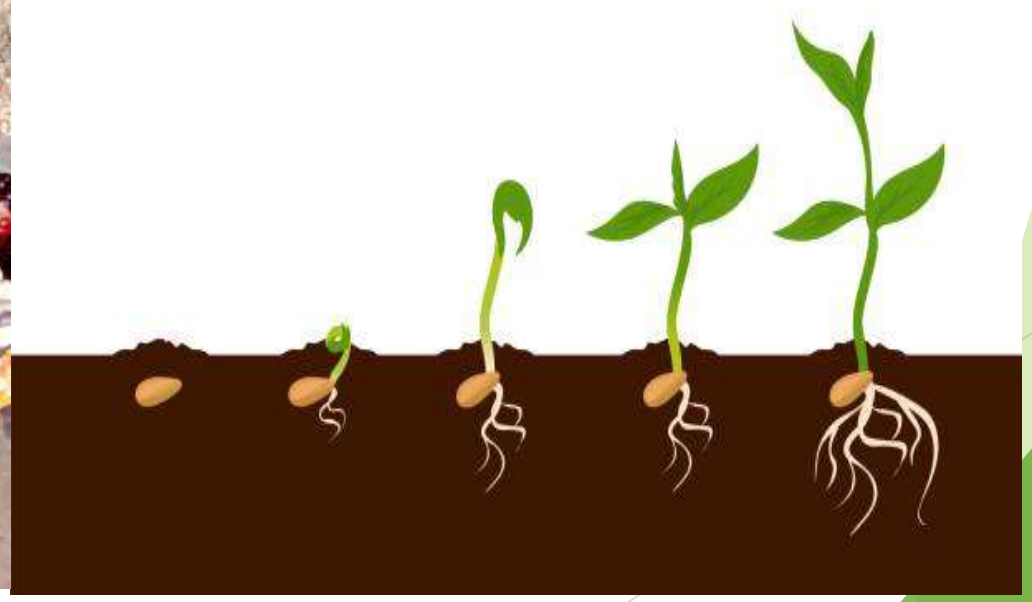
# Why do I say, my seed is my life
# What is a seed?

- Seed is the embryo of a new life, It is the beginning of every living thing
- seed has the potential to grow and mature to be the future food
- Seed has a large influence on day to day human life for providing nutrition,
- They also has the potential to grow the foundation of human diet across the world.

# Right from a seed to a  living plant

Seeds

Stages of a seed development to a plant



# 1. Site Selection

- Well drained soil is preferable

- Waterlogged areas must be avoided.

# 2. Land preparation

- It is advisable to make sure that the soil is prepared to a fine tilth.

# Application of cured compost


- Improves structure --- compost - breaks up clay and clods and bind together sandy soil. Its helps make proper aeration in clay and sandy soil possible.
- Moisture Retention -- Compost holds 6 times its own weight in water.
- Aeration –Plants can obtain 96% of the nutrients they need from the air, sun and water. A loose healthy soil assist in diffusing air and moisture into the soil and in exchanging nutrients.
- Fertilization – A well prepared Compost contains nutrients like Nitrogen, phosphorus, potassium, magnesium and sulphur and calcium but is especially important for trace element.

# 3. Sowing of suitable seed variety

Seeds should be wholesome (free of physical damage, pest infestation and disease) and should be adequately dried before being stored in a clean and well-ventilated area.

## SEED MANAGEMENT:

### a. Proper watering

This is the application of water to the crops.

In the dry season, planting is done near the water sources and watering should be done thoroughly.

# b. Weeding

- For most annual crops, timely weeding is recommended.

- On small holder farmers farms this is done using hand hoes with wooden handle as well as hand weeding

# c. Thinning

Thinning is carried out at the same time as hand weeding, or at intervals during the crop cycle, particularly where thinnings are used as immature vegetables or livestock feeds

## Proper Nutrition:
## Ensure your seeds get all the requirements nutrients from the soil


- Nutrition plays a critical role in early seed development
- Depending on the crop, some of these nutrients include zinc, phosphorus, iron, boron and nitrogen.
- Nutrient management involves complex interactions between the soil, plant and nutrient,
- “For instance: a plant needs zinc to use phosphorus,” “If a field is deficient in phosphorus, it doesn’t matter how much zinc you apply, the plant can’t access it.
- “Nutrients support each they have an ideal reaction and keeping everything in balance.”
- One nutrient that help increase corn yield is zinc.
- “Zinc is an essential element that helps the seed break dormancy,”

# Calcium deficiency

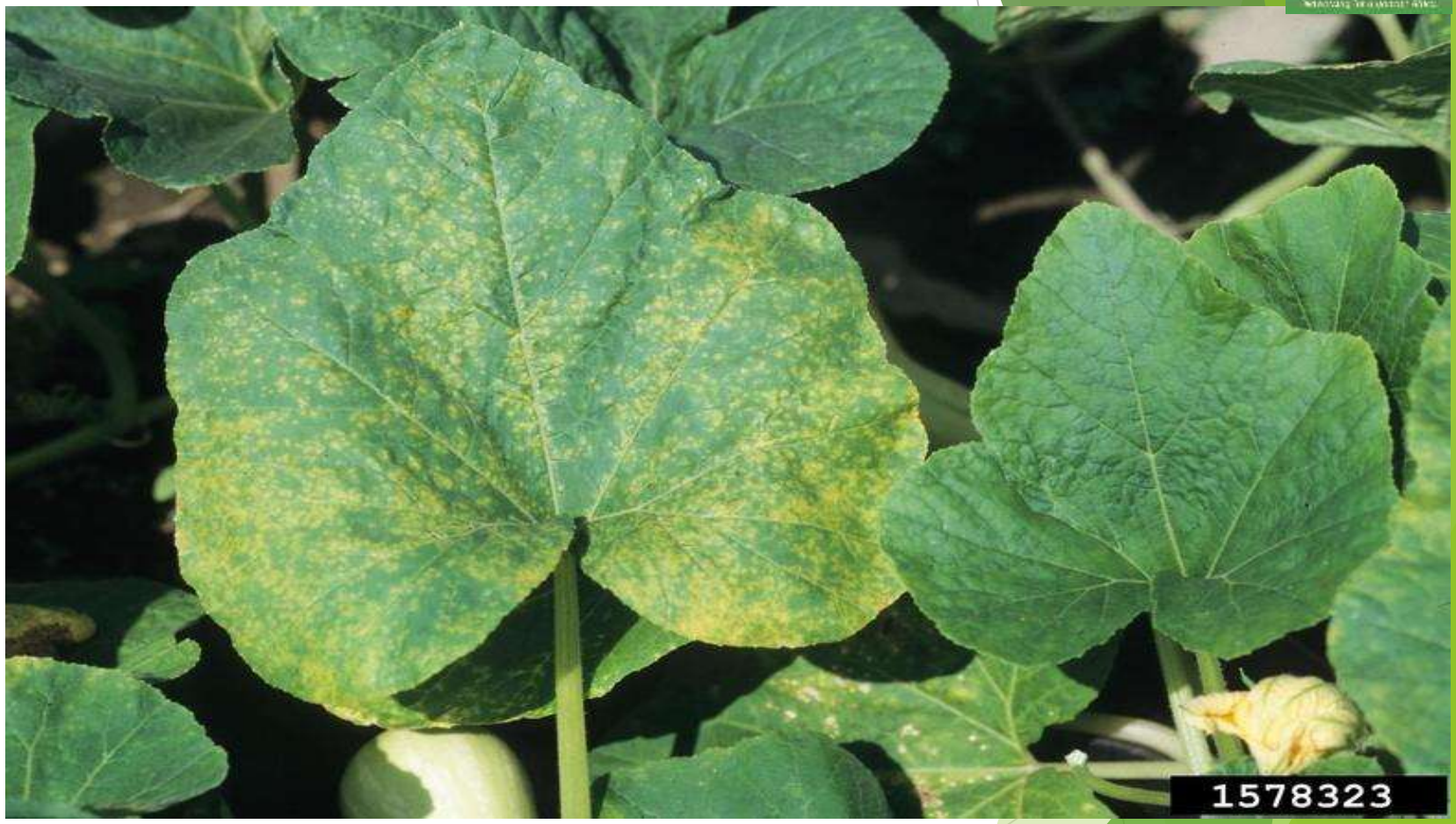
-Extreme fluctuations in soil moisture,

- Excess of salts,

-NB:Calcium deficiencies cause actively growing cells to die because they cannot retain water and nutrients.

-It is most common in watermelon and some squash.

-others like nitrogen couse yellowing of the plant etc



# Common seed borne diseases


Soybeans

cowpea

# Anthracnose

## Bean mosaic

# Seed borne diseases of cucurbits

Angular leaf spots


Fuserium crown rot

Cucumber mosaic virus

Angular leaf spot

# f drop (Sclerotinia drop) *Sclerotinia minor* *Sclerotininia sclerotiorum*

# Septoria leaf spot *Septoria lactucae*

# How to control seed borne diseases

- Physical seed treatment methods. We use Heat treatments to control certain seedborne pathogens while maintaining seed viability.
- This includes hot water, hot air, aerated steam, and radiation.

**- Healthy soil.**

Caring for soils involves:

Maintain levels of humus that give structure to the soil.

Feed organisms which live in the soil provide nutrients for crops.

**- A healthy crop.**

By giving plants the right growing conditions they will be more able to resist pests and diseases.

**- Resistant varieties and genetic diversity within a single crop.**

**- Crop rotation.**

**- Good hygiene.**

- Soil's PH
- Timely sowing.
- Companion planting.
-Barriers/buffers

## NATURAL PESTICIDES – last resort

If pests and diseases cannot be prevented or controlled by cultural and physical means it may be necessary to use natural pesticides.

### 1. Garlic

Garlic spray in particularly good against army worms, bean beetles. Garlic can also kill nematodes if soil or batches of soils are drenched with garlic liquid.

### 2. Egg shells

The sharp edges will deter cutworms. Applying crushed shells around the stem of the plants will deter slugs and snails.

**3. Ash**

- Snails and slugs also dislike sand  limes and ashes.

**4. Diatomacious earth**

- Kills slugs, snails and ants that should only be applied to problem areas to avoid killing worms and similar garden occupants .Diatomaceous earth  consists of fossilized remains of diatoms, single cell organisms. Insects die of dehydration.

**5. Compost**

- By adding nutrients to the soil you increase the strength of the plants and a healthy plant has a better chance to fight diseases

# me Sulfur brew

- 5kg sulfur
- 2.5kg Builder lime
- 20 ltrs of water

- Boil for 30min under heavy heat staring the solution from one direction until the solution turns color to light yellow
- Let the solution cool and dilute 0.5littrs to 20 litters of water
- Preserve the solution with a little liquid oil

# Types of Seeds and seeds that can be saved


**Heirloom:** Good for seed saving

- Open-pollinated seed varieties
- Over 50 years old
- Not the vegetables you usually see in grocery

**Hybrid and GMOs:** Not reliable for saving

- Bred for specific characteristics by crossing two varieties
- Seeds germinate, but do not breed true to parents
- Seeds from hybrids may produce plants whose taste, color, size, etc., may not be desirable

# Where to Find Heirloom Seeds

- Existing local seed swaps
- Your own seed circle of neighbors, friends
- Farmers
- Seed saving organizations like G-BIACK, Seed Savers Kenya.

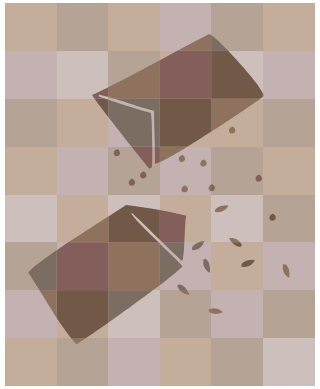
# Benefits of Saving Seeds

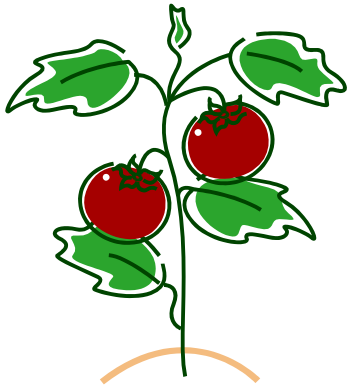
- Engage in the cycle of life
- Preserve heirloom varieties

***Heirloom** plant species are plants grown from **seeds***
*that are passed down from generation to generation*

- Encourage genetic diversity
- Save money

# Engage in the Cycle of Life





# Encourage genetic diversity

- The total number of genetic characteristics in the genetic makeup of a species.
- More variation → greater adaptability
- Selective breeding →monoculture

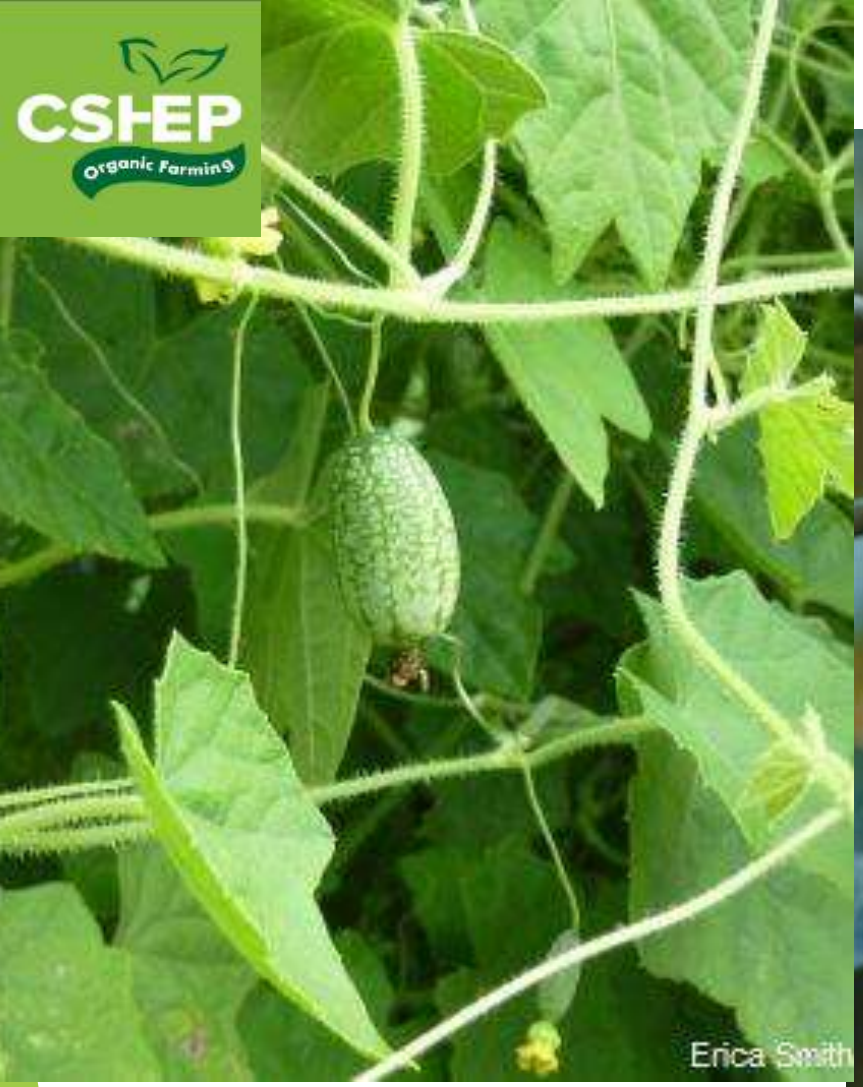
# FLINT MAIZE

**Flint maize also known as Indian Maize. Each kernel has a hard outer layer to protect the soft endosperm, it is likened to being hard as flint;**

# DENT MAIZE

**Dent maize has high soft starch content. It received its name because of the small indentation ("dent") at the crown of each kernel on a ripe ear of maize. Its soft and so it can easily be infested by weevils**

# Preserve heirloom varieties





# The Original Bean varieties

# Save money !

Perhaps the most attractive of all!


# Our Health depends on Seed Diversity

- **Pollination**

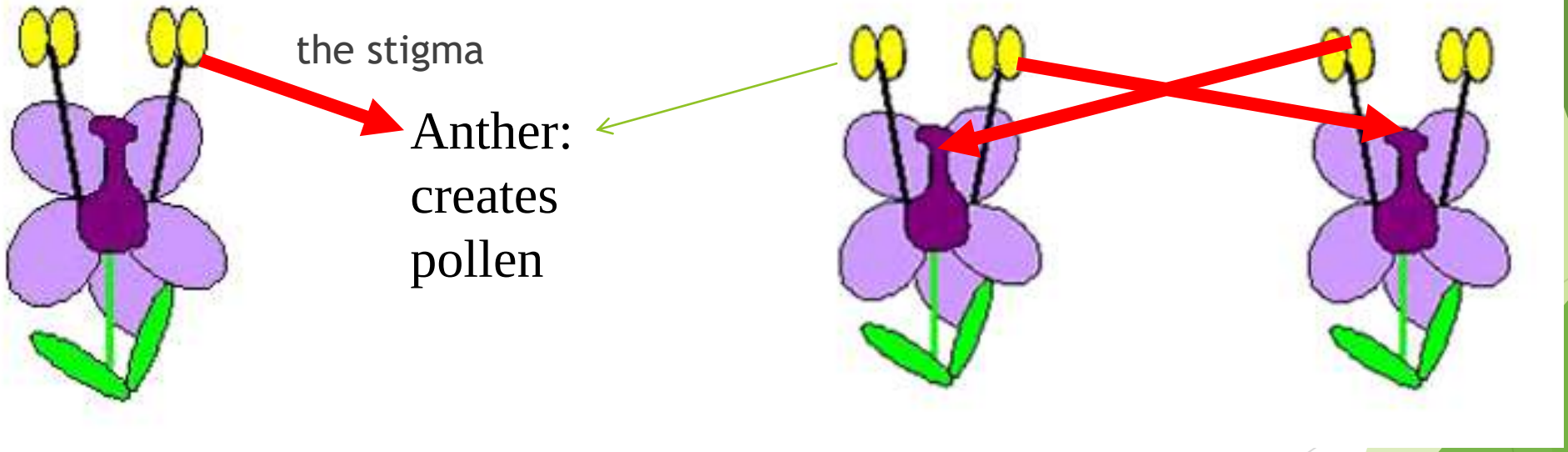
## Can we have seeds without pollination?

## What is Pollination?

T from the anther

the stigma

Anther: creates pollen



**Self pollination**

**Cross pollination**

# Understanding Pollination

- Pollination impacts seed quantity and quality
- Optimum conditions for successful pollination are not the same for al plants


## Pollination Challenges

- **Self pollination** easiest: tomatoes, beans, lettuce, peas
- **Cross pollination** – by wind, bird, or insect harder: Pumpkins, squash, cucumbers, okra, peppers, carrots, corn, radishes

# Pollination Control Techniques

If your plant requires wind, insects, or birds for pollination you can use:

- Physical distance separation
- Growing only one variety for saving & exchanging seeds with other seed savers
- Bagging & hand pollinating
- Cages to exclude bees & hand pollinating

# When to Harvest Seeds

- Ideal time to harvest varies from plant to plant
- Some seeds (e.g., melon) are ready to harvest when fruit is ready to eat
- Other seeds (e.g., squash and cukes) should be left on vine *after* you would normally eat them

## sting and Harvesting techniques

For seeds, harvesting is best done when crops are fully matured and the fruits are drying.

Further drying will be needed to reach the 10% moisture content for good storage and to be processed into seeds.

# harvesting Flower Seeds

Calendula

- Do not **deadhead**!
- Wait for petals to fall off
- Seed head or pod will be exposed

**sunflower**

- Cut flower several inches/fts below seed head
- Dry seed head in bags upside down
- Seeds will fall to the bottom
- Can take 1 to 4 weeks depending on the plant

# Cleaning Seeds

Two types: dry seeds & wet seeds

## DRY

Bean
Broccoli
Chilies
Maize
Eggplant
Lettuce
Pepper

## WET

Berries
Cucumber
Melon
Pumpkin
Squash
Tomato
passion

# Cleaning Dry Seeds

Separate seed from chaff by:

**Winnowing in a gentle wind**

**Using screens of varying mesh size**

# Cleaning Wet Seeds

- Most seeds: Place in mesh strainer and gently wash with water; pat underneath strainer with towel
- Some seeds: Must ferment first to remove germination-inhibiting substances, e.g., tomato, K-aple.


# Tomato Seeds

Let stand at room temp for 2-3 days; stir a few times a day

Pour off pulp & any dead seeds that float

Good seeds sink to bottom &

# Drying Wet Seeds

- Pat bottom of strainer with cloth towel
- Let dry a few hours
- Spread seeds on plastic, glass or ceramic plate to dry (not paper or even waxed paper): use a non-sticking material


Drying tomato seeds

- Spread seeds only 1 or 2 thick
- Dry in an airy, dry location, such as an air-conditioned room
- Keep humidity between 20% to 40%
- Takes 2 weeks or more
- **LABEL** them!

**Always LABEL Your Seeds**

# Seed Storage Containers

- Seed type and date collect
- Special characteristics

Place seeds in individual paper envelopes, wax paper, or zip lock bags.



**Label** with variety name, collection date, even picture of plant in bloom.

**Store seed packets in larger containers, such as zip lock bags, screw-top jars, or accordion folders by month to plant.**

# Where to Store Seeds

- **Good**: Cool, dry, and dark place—closet or cupboard
- **Better**: Airtight containers in refrigerator
- **Best**: Dry to 5 to 7% moisture content by weight; store several degrees below freezing (not many of us can be this precise!)

# Problems With Stored Seeds 1

- Temperature variation
- Moisture fluctuation
  - If weather is humid when drying, put desiccant (silica gel packet) in container with seeds, remove after 7 - 8 days
- If after drying, see:
  - Mold or mildew on seeds
  - Moisture on inside of storage container
  - Also use desiccant


- Insects
  - Freezing is safest
  - Add diatomaceous earth (DE)
- Animal pests
  - (use tightly closed containers)

# How Long Will My Seeds Last?

It depends… 1-3 years are the best but they can go upto:

- **Long lived** (> 5 years - *in general*) : Brussels sprouts, cabbage, cauliflower, celery, cucumber, eggplant, lettuce, melon, radish, rutabaga, spinach, squash, and turnip
- **Medium lived** (3-5 years - *in general*): Bean, beet, broccoli, carrot, leek, pea, pepper, pumpkin, and tomato
- **Shorter lived** (1-2 years - *in general*) : Corn, onion, parsley, parsnip

# Threat to our indigenous seeds

- Patented Genetically Modified seeds
- Punitive law against farmers right to save, breed and exchange seeds
- Hybrid seeds which denies the farmers opportunity to access open pollinated seeds

# How To Estimate Germination Rate

Place 20 seeds on wet paper towel/cotton wool

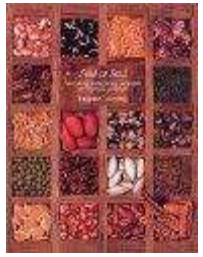
Cover with wet paper towel, roll

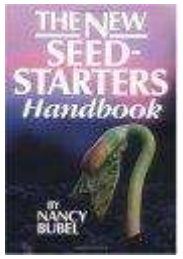
Place in plastic bag + holes → 75°

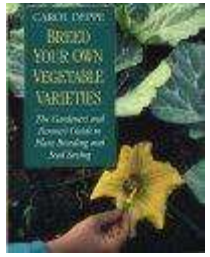
Count at day 6:
18/20 = 90% GR

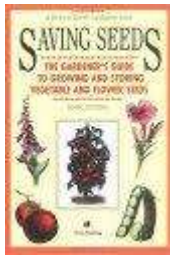
# Resources on Seed Saving

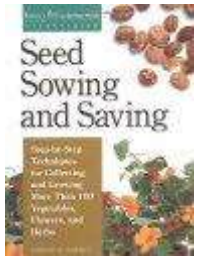
- Ashworth, Suzanne. Seed to Seed
- Bubel, Nancy. The New Seed Starter's Handbook
- Deppe, Carol. Breed Your Own Vegetable Varieties
- Rogers, Marc. Saving Seeds
- Turner, Carole. Seed Sowing and Saving
- Rowe, Jack. http://howtosaveseeds.com - Vegetable Seed Saving Handbook





# My Final Thoughts:

- To be sure your seeds breed true use heirloom varieties
- Consider starting out with a self pollinating plant
- For cross pollinating plants grow one variety and share with other seed savers,
- Test your seeds before planting


Are you sure you also save seeds?
Can I send you to CSHEP, G-BIACK ,BIOGI or Seedsaver network to learn more about seed saving?

*LET US SAVE OUR SEEDS,TO SAFE OUR FUTURE*

*OUR SEEDS, OUR HERRITAGE , OUR FOOD SOLVERINITY*

*Remember,to share seeds*

# THANK YOU!

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