



NDSU | EXTENSION

2025

field to fork



Upcoming Webinars

- **April 2 - Plant Pathology 101:
Common Plant Diseases**
 - Sam Markell, NDSU Department of Plant Pathology professor and interim department chair
- **April 9 - All About Alliums: Garlic, Green Onion,
Dry Bulb Onion, Leeks and Shallots**
 - Harlene Hatterman-Valenti, NDSU Department of Plant Sciences professor



Presenter

Audio Settings ^



Chat



Raise Hand



Q&A

Leave

- **Please complete the short online survey** that will be emailed to you after today's webinar. It will take just a couple minutes!
- Be sure to sign up for an opportunity to win a prize in the drawing. After submitting the survey, a form to fill out with your name/address will appear.

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March 26

Tips and Tricks for Vegetable Production

Susie Thompson, NDSU Department of Plant Sciences associate professor and potato breeder



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United States Department of Agriculture

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U.S. Department of Agriculture
Office of the Assistant Secretary for Civil Rights
1400 Independence Avenue, SW
Washington, D.C. 20250-9410; or

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program.intake@usda.gov.

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Farm AD-475-A—Revised February 2019

Más información en español en el folleto AD-475-A / Spanish July 2019



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Gardening...

Created 18.3 million new gardeners, mostly millennials.

42% of gardeners spent more time gardening

55% of American households engage in gardening

Millennials make up 29% of gardeners

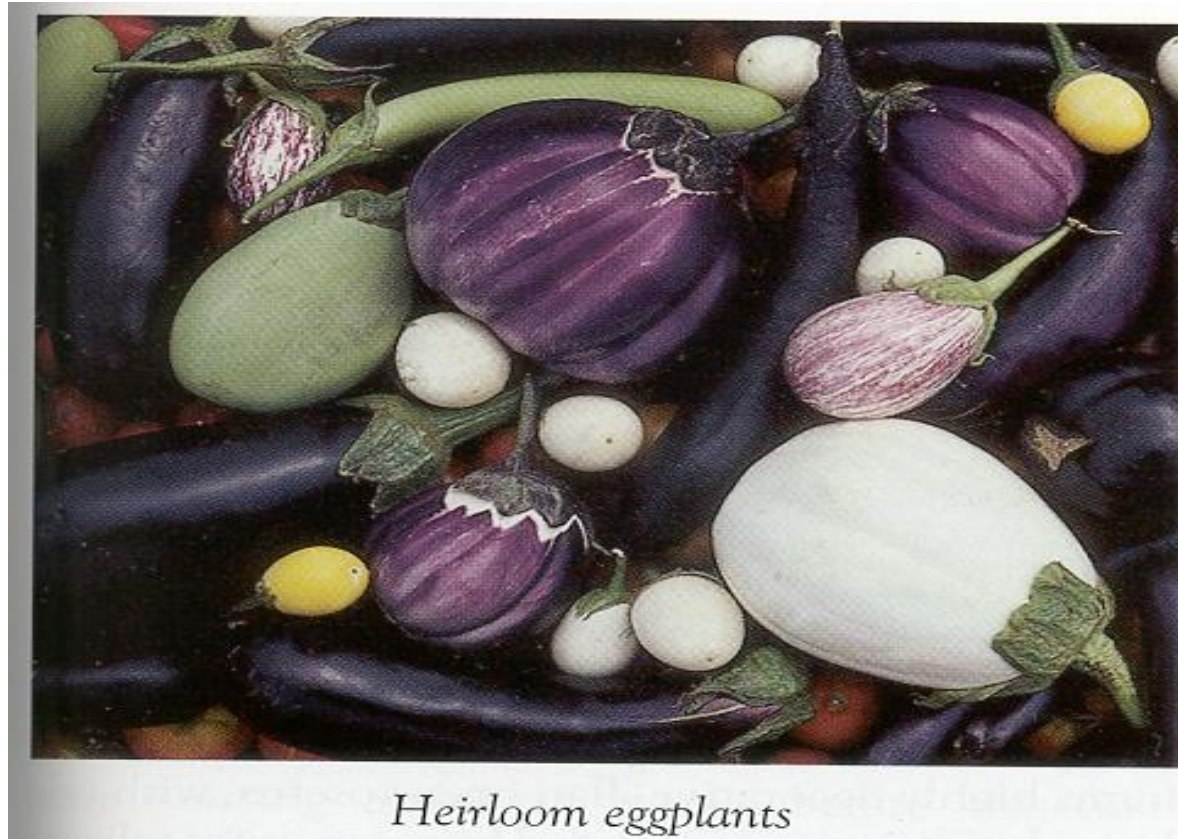
The average garden yields \$600 of produce in a year
35% of U.S. households grow vegetables, fruits, and other food.

Children involved in growing vegetables are more willing to eat them.

References contained in [Gardening Statistics in 2024 \(incl. Covid & Millennials\) | Garden Pals](#)



Hodge Podge of Topics

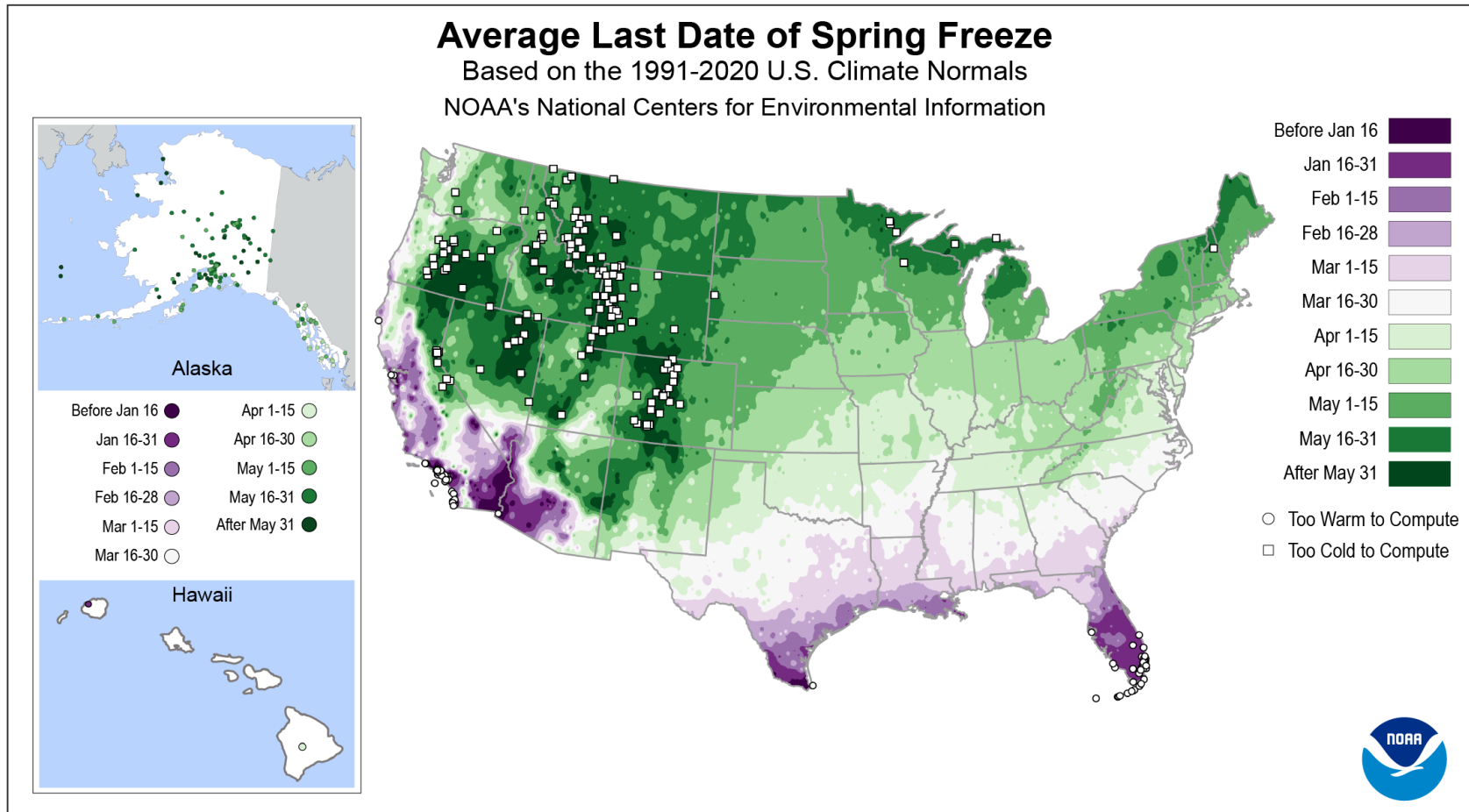


Burpee The Complete Vegetable and Herb Gardener, 1997

Hardiness Zones



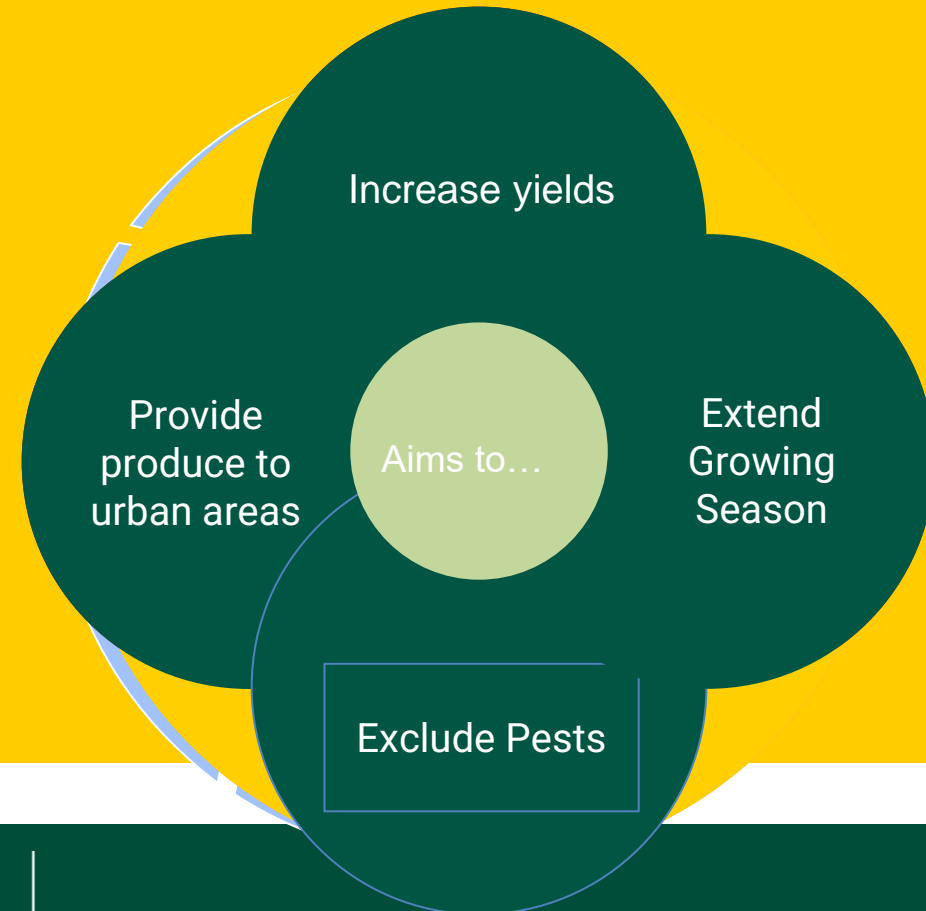
Frost Dates



[When to Expect Your Last Spring Freeze](#) | [News](#) | [National Centers for Environmental Information \(NCEI\)](#)

Protected Culture

- The use of technology to modify the natural environment of vegetable crops
- Includes...
 - Greenhouses
 - High tunnels
 - Low tunnels
 - Hotcaps
 - Bed covers
 - Vertical farming
 - Hydroponics and aquaponics

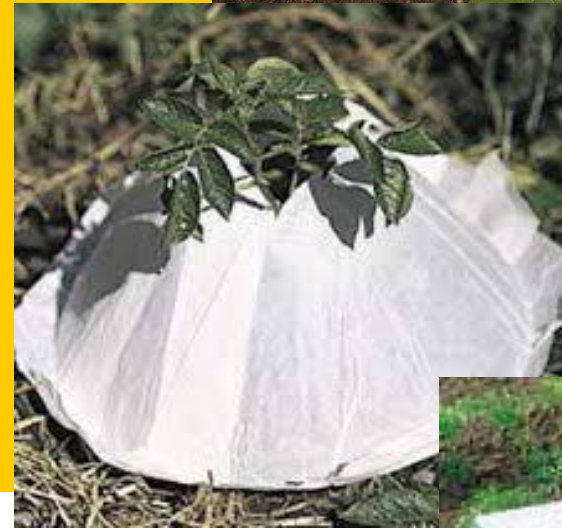


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Hot Caps

- Small plastic or woven coverings for individual plants
- Relatively inexpensive
- Not optimal for large scale operations
- Must be removed or cut open as plant grows



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Sources unknown

Row Covers

- Lightweight fabric laid directly on top of row
- Edges of fabric are buried after planting or stapled
- Protect seedlings from flying insects
- Hold in heat
- Reduce soil evaporation
- Must be removed when crop begins pushing on fabric
- Can vary in thickness



Sources unknown

Cautions

- Advantages
 - early growth and early maturity
 - higher yields
 - protection from insects and wind
 - some frost protection
- Disadvantages
 - high temperature buildup
 - heat stress
 - physiological problems
 - bolting
 - aborting buds/flowers

Low Tunnels

- Short transparent tunnels
- Usually less than four feet tall
- Can be opened and closed to modify the temperature
- Not suitable for taller crops
- May exclude pollinators
- Added management



Source unknown

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High Tunnels

- Intermediate between temporary and permanent
- Usually consist of a double layer of plastic film
- Allow for early warm season vegetable production
- Larger size allows for vertically growing plants ex. tomato



Sources unknown

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Management Considerations

- Rainfall may be excluded so irrigation may be necessary
- Nutrient inputs may be conventional or organic
- Monitor for insect pests and diseases
- Crop rotation is important



Source unknown

Solarization

- Soil diseases can be managed with fumigants
 - Dangerous
 - Impractical in gardens
- Steam sterilization
 - Expensive
- Solarization utilizes the heat from the sun to heat the soil to 110F. Can simply use clear plastic.



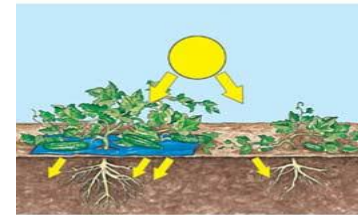
Sources unknown

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Mulches

- Modify soil surfaces
- Enhance crop growth
- Materials
 - Organic
 - Plastic
- Benefits
 - Reduce evaporation
 - Warm the soil
 - Improve weed control
 - Protect from frost



Sources unknown





Companion Planting

- Growing specific plants together to improve growth, reduce pests, and save space

Insect Management

- With smells
- Attracting predators or parasitoids
- Visually distracting



Companion Planting Guide

Vegetable	Plant Near	Avoid
Asparagus	Basil, Parsley, Tomatoes	Onions, Garlic, Potato
Basil	Asparagus, Tomato, Peppers	None
Bush Beans	Nasturtium, Beets, Marigolds	Onions, Garlic
Pole Bean	Corn, Cucumber, Squash, Peas	Onions, Brassicas, Fennel
Beets	Carrots, Corn, Cucumbers	Dill, Pole Beans
Broccoli	Chamomile, Dill, Garlic, Mint	Dill, Pole Beans, Brassicas
Brussel Sprouts	Bush Beans, Beets, Garlic	Pole Beans, Tomatoes
Cabbage	Beets, Chamomile, Cucumbers	Beans, Tomatoes
Carrots	Chives, Onions, Radishes	Dill, Parsnips, Potatoes
Celery	Beans, Brassicas, Nasturtiums	Carrots, Parsnips
Cilantro	Celery, Peas, Potatoes	None
Corn	Beans, Peas, Squash, Melons	Celery, Tomatoes

Systems for classification

- Botanical description
- Edible plant part
- Temperature requirement and hardiness
- Life cycle
- Others



Vegetable Families

- Apiaceae (Carrot Family)
 - Carrot, celery & parsley
- Asteraceae (Sunflower Family)
 - Chicory, endive & lettuce
- Brassicaceae (Mustard Family)
 - Broccoli, Brussels sprouts, cabbage, cauliflower, Chinese cabbage, collard, kale, kohlrabi, mustard, radish, rutabaga & turnip
- Chenopodiaceae (Goosefoot Family)
 - Beet, chard & spinach
- Cucurbitaceae (Gourd Family)
 - Cantaloupe, cucumber, pumpkin, squash & watermelon
- Fabaceae (Pea or Pulse Family)
 - Bean, pea & peanut
- Liliaceae (Lily Family)
 - Asparagus, chive, garlic, leek, onion & shallot
- Poaceae (Grass Family)
 - Corn
- Solanaceae (Nightshade Family)
 - Eggplant, pepper, potato & tomato

Adapted from 'Complete Guide to Vegetables, Fruit & Herbs', Meredith Books, 2004

Edible plant part

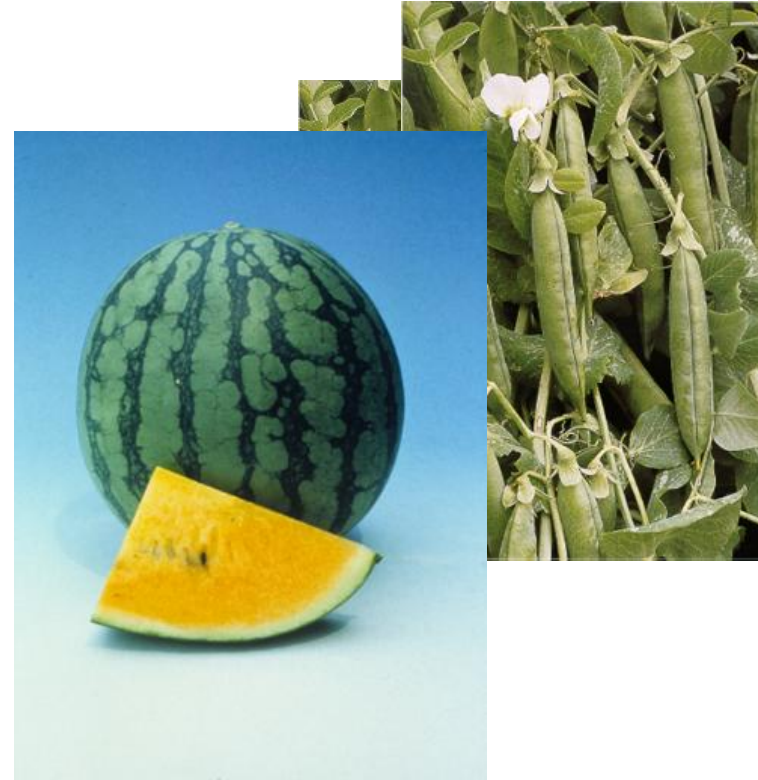


Rodale's Illustrated Encyclopedia of Organic Gardening, 2002

- Root - beet, turnip
- Bulb - onion, garlic
- Stem - asparagus
- Flower - cauliflower
- Tuber - potato
- Immature fruit - squash
- Mature fruit - tomato
- Leaf - lettuce, cabbage
- Petiole - celery
- Seed - bean

Temperature requirement and hardiness

- Cool season crops
 - 12-20C (50-75F)
 - hardy
 - half-hardy
- Warm season crops
 - 18C (65-90F)
 - tender
 - very tender



American Selection Committee and Burpee The Complete Vegetable and Herb Gardener, 1997

Classification based on life cycle

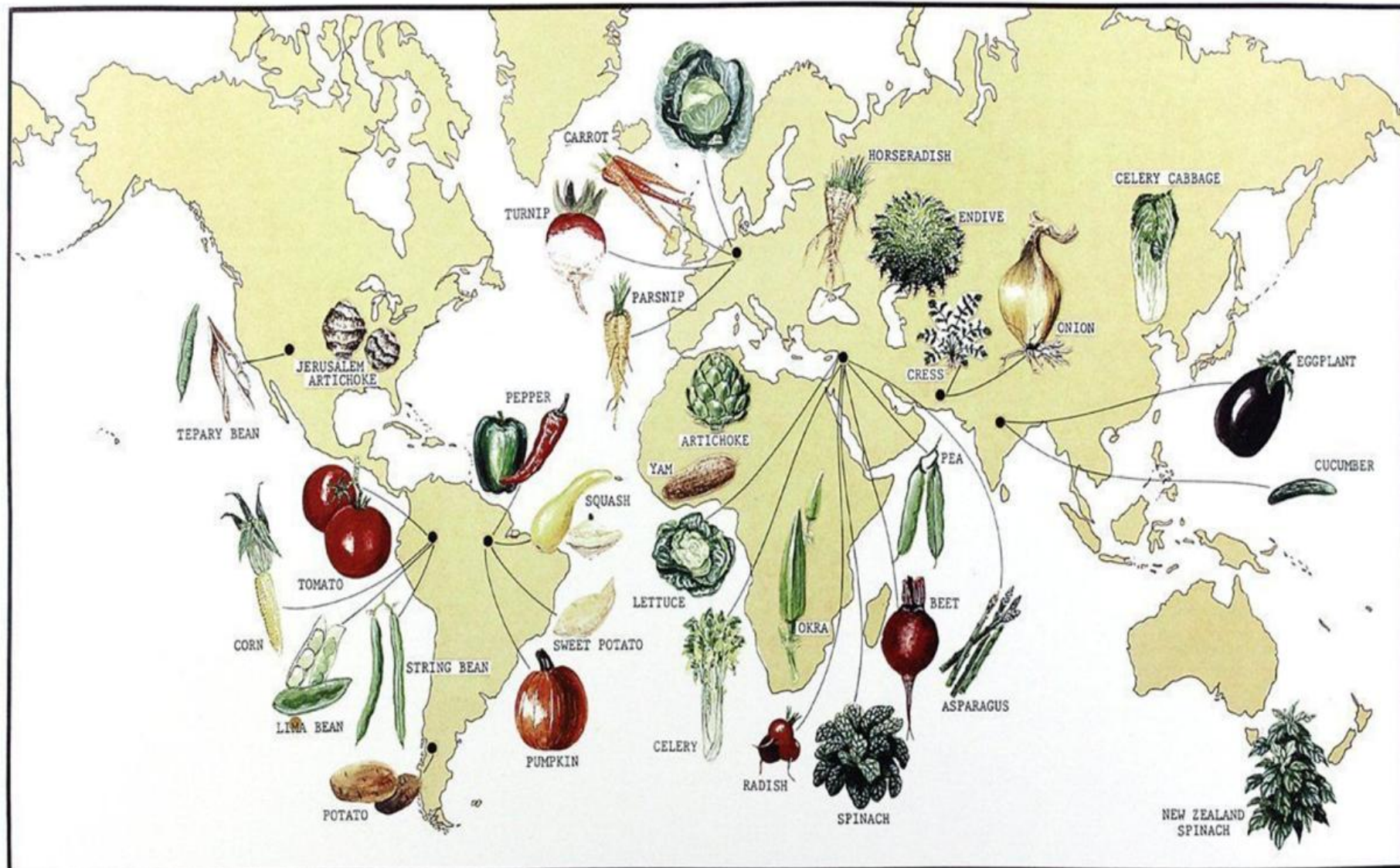


Burpee The Complete Vegetable and Herb Gardener, 1997

- Annual
 - broccoli, cauliflower, lettuce, pea, potato, pumpkin, radish
- Biennial
 - beet, Brussels sprout, cabbage, carrot, onion, parsnip, turnip
- Perennial
 - asparagus, chive, eggplant, garlic, pepper, rhubarb

Centers of Origin

- Plants gathered in wild
- Domestication
- Time varied/varies depending upon species
- No major vegetable crops originated in the US
 - Jerusalem artichoke, Tepary beans, and sunflowers



P. Duke ©

CENTERS OF ORIGIN FOR SOME VEGETABLES



New Cultivars

- Resources
 - Dr. Esther McGinnis
 - Dr. Tom Kalb
 - Don Kinsler
 - County Extension
 - Publications

Aging Gardeners



Raised Beds



[15 Tips to Make Gardening for Seniors Easier and More Accessible](#)

Containers



[12 Tips for Growing Lettuce in Containers](#)



[15 Tips to Make Gardening for Seniors Easier and More Accessible](#)

Hydroponics

- Simple options
 - Myriad of vegetables
- Start transplants
 - Off-season gardening

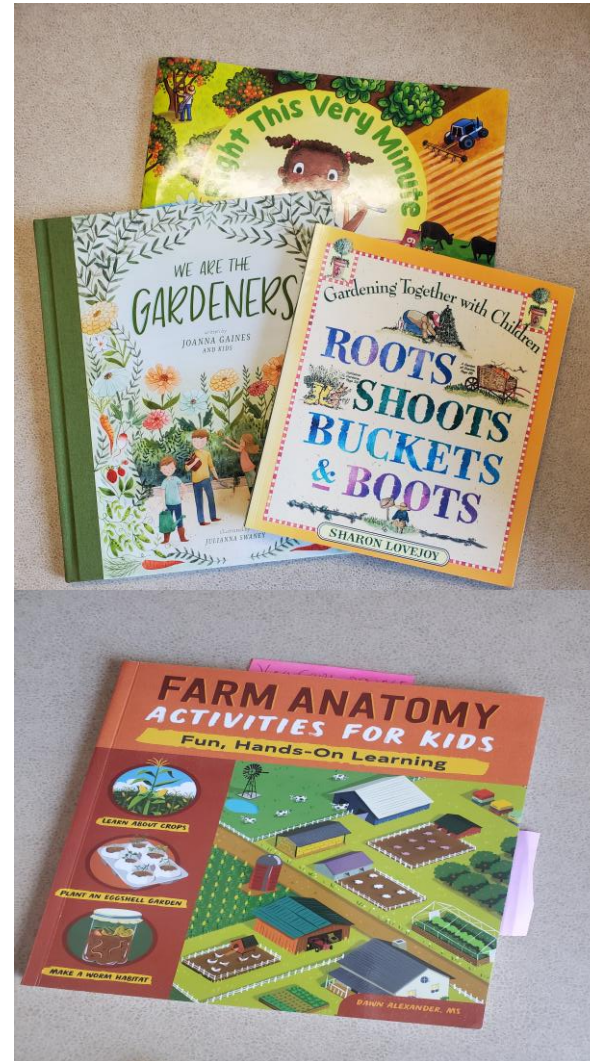


Germination Testing

- Ragdolls
- Petri plates



GARDENING FUN



Thank you

