Peppers

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Argonne Garden Club
September 2012 Meeting

Origin:

- **Capsicum:** (origin: Greek: *To bite* / Latin: *chest or box*)
- **Solanaceae**: The same botanical family as tomatoes, potatoes, eggplant & tobacco. All From Meso- / South America.

- Nahuatl word for pepper is *chilli* (*xilli).* Cultivated since 3000 BC - Predates cultivation of corn @ 2500 BC.

- Peppers have travelled to every continent since their "discovery" in 1490's.
- Called "pepper" by Columbus due to similarity in flavor/pungency to Asian black pepper (*Piper*). No relation.
- Quick assimilation in Spain, Italy, Africa, Balkans, India, then "Far East".
- Colorful, tasty, nutritious, food preservative, easy to dry.

Human usage

- Sweet or Hot, peppers are very nutritious: Vitamin C, A, carotenes, antioxidants.
- Easy to dry and store.
- Myriad of uses: fresh, pickled, dried, extracts.
- Food, beverage, medicine, currency, ritual, esthetic, entertainment.
- Hundreds of names for peppers worldwide; also depends on forms (dried vs. fresh, etc.)

Nutrition

- Vitamin C:
  - Average green chili: 240 mg/100g.
  - Average red chili: 140-190 mg/100 g.
  - Orange: 50 mg/100 g.
  - Lemon: 40 mg/100 g.
- Identification of Vitamin C in early 1930's by Albert Szent-Györgi owed to Hungarian Paprika (Nobel Prize).

Why are peppers hot?

The main culprit:

Capsaicin (8-methyl-*N*-vanillyl-6-nonenamide) –

- Hydrophobic, colorless, odorless, crystalline to waxy.
- Why do plants make it? Herbivore (mammal) deterrent and antifungal/microbial.
- Mammals have receptors for capsaicin, birds do not.
- Endorphin rush from capsaicin similar to chocolate or coffee. Pure nerve excitement, no physical burn.
- Capsaicin other uses: pain relief / antimicrobial / insecticide / animal deterrent (including humans).
- Majority of heat in pepper in membranes by seeds.

Measuring Pungency

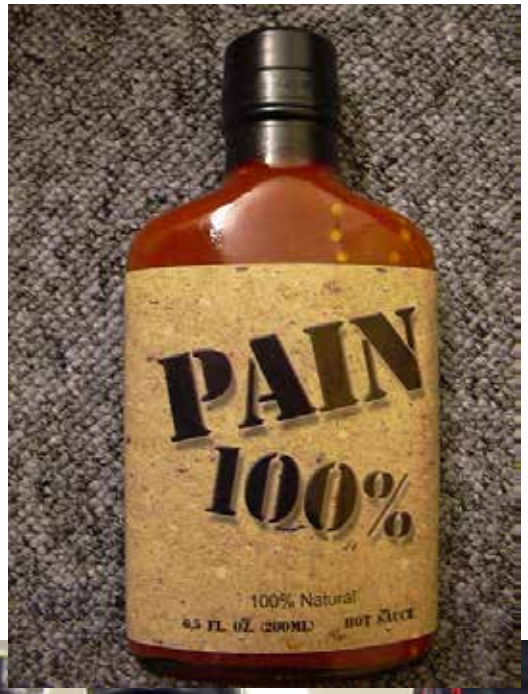
Scoville organoleptic test (1912):

- Alcohol extract progressively diluted with water and sugar.
- Max is 16 million SHU (pure capsaicin).

Modern assays use HPLC:

- American Spice Trade Association Units (ASTA)
- ASTA x 15 ≈ SHU
- Results can differ up to 50% by lab.

Scoville rating	Type of pepper
15,000,000–16,000,000	Pure capsaicin[4]
9,100,000	Nordihydrocapsaicin
2,000,000–5,300,000	Standard U.S. Grade pepper spray [5]
855,000–1,041,427	Naga Jolokia [6][7][8][9]
350,000–577,000	Red Savina Habanero
100,000–350,000	Habanero chili,[10] Scotch Bonnet [10]
100,000–200,000	Rocoto, Jamaican Hot Pepper [5], African Birdseye
50,000–100,000	Thai Pepper, Malagueta Pepper, Chiltepin Pepper, Pequin Pepper
30,000–50,000	Cayenne Pepper, Ají pepper [10], Tabasco pepper
10,000–23,000	Serrano Pepper
5,000–10,000	Wax Pepper
4,500–5,000	New Mexican varieties of Anaheim pepper [11]
2,500–8,000	Jalapeño Pepper
1,500–2,500	Rocotillo Pepper, Sriracha
1,000–1,500	Poblano Pepper, Texas Pete sauce
500–2500	Anaheim pepper [12]
100–500	Pimento [5], Pepperoncini
0	No heat, Bell pepper [5]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5 Cultivated Pepper species:

- ***C. annuum***: Bell, Anaheim, Fresno, Cubanelle, Paprika, Wax, Cayenne, Jalapeño, Serrano, Poblano, Pasilla, Thai, Chinese, Chiltecpin
- ***C. chinense***: Habanero, Scotch bonnet, “Aji Dulce”, Datil, Bhut Jolokia, Trinidad Scorpion
- ***C. baccatum***: Aji amarillo, Lemon drop
- ***C. frutescens***: Tabasco, African Birdseye
- ***C. pubescens***: Rocoto

C. annuum

C. annuum

- Name change depending on form

Poblano

Ancho

Jalapeno

Chipotle / Morita

C. annuum

- Chiltecpin, Chiltepin, Tepin: The wild type, adapted to bird dispersal.

C. chinense

C. baccatum

C. frutescens

C. pubescens

Cooking with pepper spray: The hottest this year?

Bhut Jolokia / Naga

Trinidad Scorpion

Pepper Culture

- Seeds generally hard-coated, slow to germinate, need heat, light and humidity. Best started indoors in March to April with bottom heat. Expect 14 to >30 days to germinate.
- Perform best at 65 to 80°F. Sandy soils. High Organic matter. pH 5.5-6.8.
- Average pepper needs 60-100 days to maturity; longer for tropical types.
- Hot/warm days and cool nights best for fruit set.
- Drip irrigation and mulching beneficial.

Pepper Harvest

- Mature peppers sweeter & nutritious. Pick at color change & store room temp to ripen.
- Prep for storage: roast & peel, seed & devein.
- Blanch & freeze, can (with acidity), dry.
- Horticultural effects on pungency:
  - Varies by soil, culture, weather.
  - Pungency on one plant can be like rolling dice.

Pepper Harvest

Paprika in Serbia

Pests & Disease

- Damping off, phytophora, rhizoctonia of seedlings:
  - Controls: Soilless mixes, sanitation, copper sprays, higher temps, increased air movement and light, certified seed, treated seed.
- Aphids, whiteflies, leafhoppers, spider mites.
  - Controls: Insecticidal soaps, neem oil, pepper sprays.

Pests & Disease, cont.

- Bacterial (leaf) spot, anthracnose, fusarium, Southern blight, verticillium wilt.
  - Controls: Resistant varieties, copper soap sprays, Bordeaux mix, pepper sprays, cultivation, mulching, rotation, sanitation.
- Viruses.
- Blossom end rot, sunburn.
- Nematodes, mice, deer.

www.chilepepperinstitute.org