

A photograph of a field of amaranth plants. The plants have large, bright green, heart-shaped leaves and several long, drooping panicles of small flowers. The flowers are in various stages of bloom, showing shades of pink, magenta, and purple. In the background, there are more plants, some with yellow flowers, and a glimpse of a white building with a red roof under a clear blue sky.

# Amaranth Grain

An ancient legend, or the crop of  
the future?

# Outline

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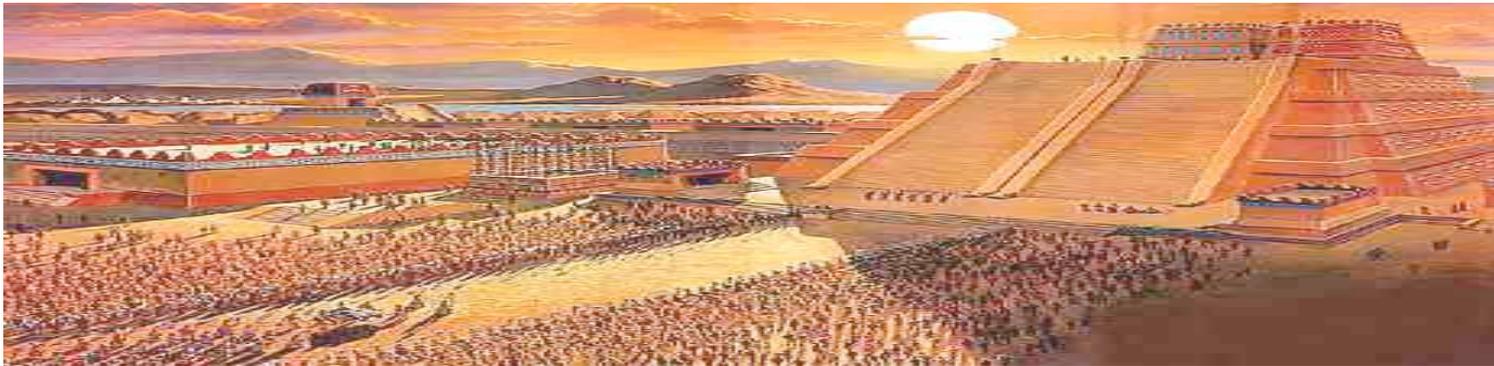
- Historical context
- Domestication
- Physical characteristics and their importance
- Ramifications for future cultivation
- An alternative study

# Quick Facts

- ⇒ Family Amaranthaceae
- ⇒ There are over 60 species, most being weedy with only 12 used for cultivation
- ⇒ The three main cultivated species are
  - Amaranthus caudatus*
  - Amaranthus hypochondriacus*
  - Amaranthus cruentus*
- ⇒ Seeds are used as grains and the leaves are used as vegetables
- ⇒ Each plant can contain up to half a million seeds
- ⇒ Amaranth is 30% higher in protein than other grains

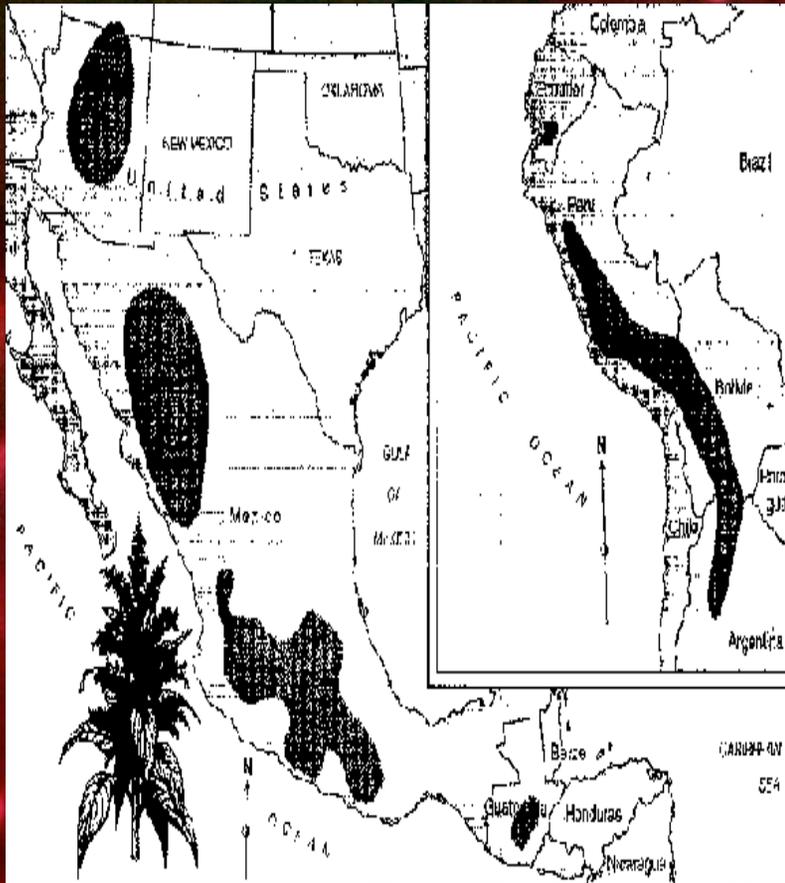


# Historical Context



- Grown by the Aztecs 5,000-6,000 years ago
- Used as a food source and a religious resource
- Over 20,000 tons of amaranth were cultivated and given to the Emperor Montezuma as an annual tribute to his health
- Seeds were ground with honey or human blood to create religious sculptures and gifts for the gods
- Amaranth mysteriously disappeared after the Spanish conquest perhaps because of their attempt to eradicate remnants of Aztec culture

# Theories of domestication



- Theory #1
- Single domestication of *A. cruentus* from *A. hybridus* with *A. hypochondriacus* and *A. caudatus* emerging from secondary crossings of *A. cruentus* with wild species
- Theory #2
- Three independent domestications: *A. cruentus* from *A. hybridus*, *A. hypochondriacus* from *A. powellii*, and *A. caudatus* from *A. quitensis*

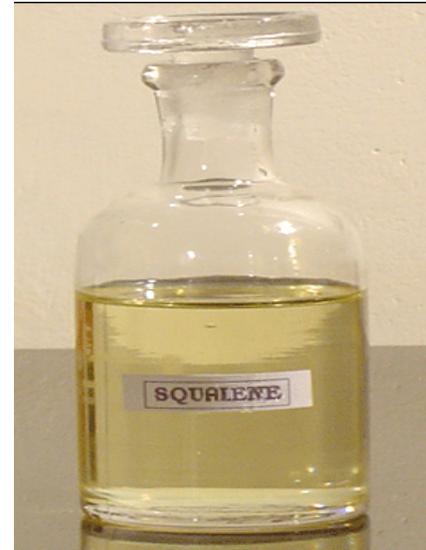
# Unique Nutritional Content



- Protein=
  - High in amino acid lysine but low in leucine. This is the opposite of most other grains
  - Thus mixing would form an almost perfect protein

# Other Potential Benefits

- Good ratio of unsaturated fat to saturated fat that is beneficial for hypertension and coronary heart disease
- Squalene
- Ethanol
- Cattle feed



# Amaranth and Photosynthesis

- Carbon 4 compound serves to suppress the loss of  $\text{CO}_2$
- This also prevents transpiration and allows for water conservation
- Thus there is potential for amaranth to be highly effective in dry and hot climates





# Pro's and Con's of Cultivation vs Other Grains

## Pro's

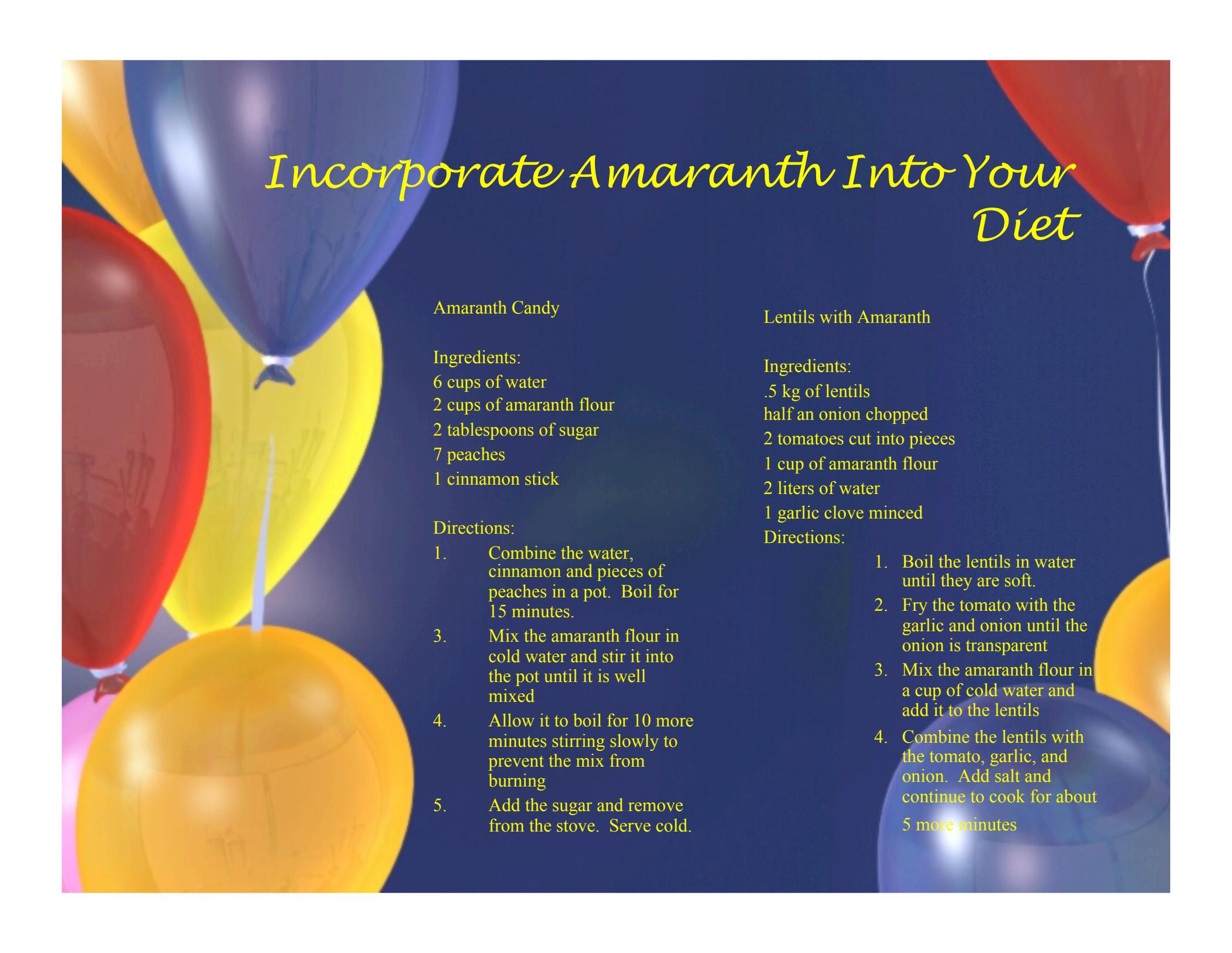
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- ⇒ Little necessary attention once amaranth seeds begin to mature
  - ⇒ High in protein
  - ⇒ Propensity to grow in unique climates
  - ⇒ High prices

## Con's

- ⇒ Problems with indehiscence
- ⇒ Lack of effective herbicides
- ⇒ High transportation costs due to low demand
- ⇒ Shift in high prices

# An Alternative to Mass Cultivation





# *Incorporate Amaranth Into Your Diet*

## Amaranth Candy

### Ingredients:

6 cups of water  
2 cups of amaranth flour  
2 tablespoons of sugar  
7 peaches  
1 cinnamon stick

### Directions:

1. Combine the water, cinnamon and pieces of peaches in a pot. Boil for 15 minutes.
3. Mix the amaranth flour in cold water and stir it into the pot until it is well mixed
4. Allow it to boil for 10 more minutes stirring slowly to prevent the mix from burning
5. Add the sugar and remove from the stove. Serve cold.

## Lentils with Amaranth

### Ingredients:

.5 kg of lentils  
half an onion chopped  
2 tomatoes cut into pieces  
1 cup of amaranth flour  
2 liters of water  
1 garlic clove minced

### Directions:

1. Boil the lentils in water until they are soft.
2. Fry the tomato with the garlic and onion until the onion is transparent
3. Mix the amaranth flour in a cup of cold water and add it to the lentils
4. Combine the lentils with the tomato, garlic, and onion. Add salt and continue to cook for about 5 more minutes