



Ancient Grains

From The Andes



Geography

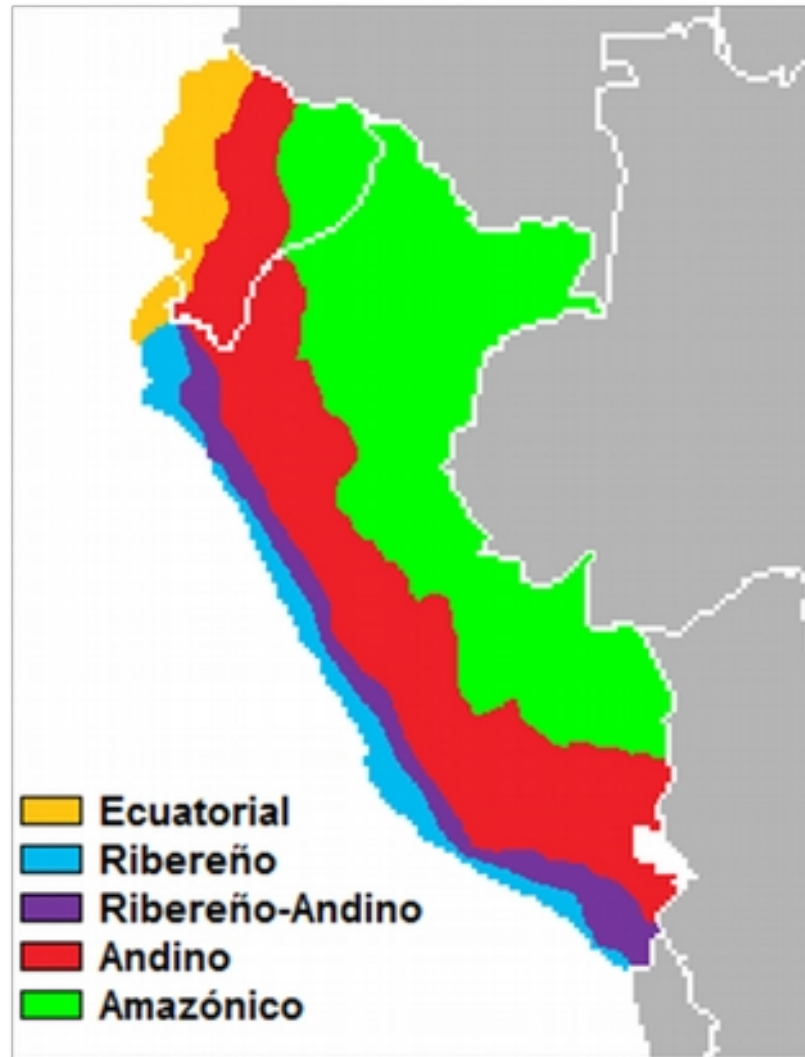


Ecuador



Latitude 0° 0° 0°

Climate



Avenue of the Volcanoes



72 Volcanoes in Ecuador

Active Volcanoes



Cotopaxi Volcano

Active Volcanoes



Cotopaxi is In Eruption

Organic Production



Amaranthus



- A. hypochondriacus
- A. cruentus
- A. caudatus/A. edulis
- A. hybridus

Ideal Characteristics

- Precocity
- Size of grain
- Adaptability to conditions
- Malleability of gene structure
- Productivity



Cultivation Factors

- Altitude – 2,700 to 3,200 mt. (8,900 to 10,500 feet)
- Soil with good drainage and pH – 6.2 to 7.8
- Temperature – 59° to 68° F
- Luminosity – 10 to 11 hours per day
- Precipitation – 600 mm per cycle
- Good seed selection



Preparations

- Grows well in poor soils
- Soil preparation between
 - Third day of waning moon
 - Third day of new moon
- Good plowing – 7 to 8 inches deep
- Dredge and leveling
- Weed control
- Drainage
- Furrows – 24 to 33 inches apart



Planting

- Mono or multiple species?
- Combine with legumes (*Lupinus mutabilis*)
- Pass seeds through mesh to select bigger seeds
- Plant between
 - Third day of moon crescent
 - Third day of full moon
- Germination >90%
- 4.5 – 6.5 lbs. of seed per acre
- 50,000 to 75,000 plants per acre
- Clear and leave one plant every 4"



Crop Management



Crop Management

- Fertilization
 - Manure - 3 to 5 tons per acre on previous cycle
 - Compost - 0.5 to 1 ton per acre
- Weed control
 - First - 40 to 45 days after planting
 - Second - 60 to 75 days after planting
- Weed control is done between
 - Third day of waning moon
 - Third day of new moon
- Hilling (aporque) - 80 to 100 days after planting



Crop Management

- Three additional fertilizations with BIOL
 - After 45 days of planting
 - During flowering
 - When grain is formed
- Wind barriers
 - Prevents flattening (acame)
 - Maintains humidity
 - Provides warmer temperature
- Popular crop rotations
 - Potato - amaranth - cereals - fava beans
 - Potato - cereals - amaranth - fava beans
 - Potato - corn - amaranth - lupini beans
 - Cows

Crop Management





Crop Management

- Plague control
 - Suckers - savia (sap)
 - Chewers - leaves
 - Drillers - roots, stem
- Diseases - fungus
 - *Rhizoctonia* spp (root, dark spots)
 - *Phytophthora* spp (lancha, dark brown injury)
 - *Ustilago* sp (prior to harvest, seeds are replaced by spores)
- Bird control
 - Scarecrows
 - Rockets
 - Cannons
 - 90 Proof

Irrigation



Irrigation

- Important during first 30 days after planting
- It is better not to use aspersion to prevent fungus
- Irrigation by gravity works fine
- Irrigation is recommended during
 - Flowering
 - Panicle/cluster (panoja) formation
 - Grain formation
- Optimal water is between 200 – 300 mm per acre
- Excess of water damages plants and decreases productivity



Harvest





Harvest

- Harvest – cut after 5 to 7 months
- Stacking (parvas)
- Threshing (trilla)
- Cleaning
- Drying
- Storing

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Challenges



Challenges

- Natural disasters
 - Volcanic eruptions
 - Earthquakes
 - Droughts
- Lack of technology
- Market competition
- Government support
- Financial assistance

Thanks

- www.nutrisolucion.com