Stevia Rebaudiana

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Introduction

- *Stevia rebaudiana*
- Commonly referred to as sweetleaf or candyleaf
- Member of the aster family – Compositae (sunflower)
- *Stevia* (genus) consists of about 150 species
Geography of Cultivation, Geography of Origin

- Native to Paraguay and Brazil (C2)
- Suitable for growth in subtropical areas as a perennial – including parts of US
- Diverse climate zones – Southern Canada to Florida as an annual
- Worldwide leaders in cultivation are China, Paraguay, Kenya, U.S. – Vietnam, Brazil, Argentina, Columbia also cultivate
USDA hardiness zones - typically survives zone 9 and higher as a perennial, occasionally zone 8

- Very susceptible to frost, roots will not survive cold winter
Morphological Characteristics

- Reaches a height of 0.5m up to 1m
- Flower heads (Aster family) are small (~15mm)
- Herbaceous growth – no woody stem
- Alternate leaf arrangement
  - Subsequent leaf primordia arise oriented 90 degrees from the previous
- Leaf size varies based on environment for growth, though fairly small
Features of Cultivation

- Requires semi-humid, subtropical climate (23 °C average), annual rainfall between 1500 to 1800 mm
- Very difficult to germinate, seeds develop slowly
  - Suitable size for transplantation into field at 45-60 days
- Prefers well drained soil
- For larger leaf production, flower buds should be removed
- Leaves are sweetest as days shorten and temperatures cool – harvest is done so accordingly
  - Although, may be harvested several times a year, depending on region/conditions
- Dry leaf yield = ~ 4 ton/hectare
Plant Uses

- Grown for its sweet tasting compounds – steviol glycosides (stevioside) that are non-calorific
- Was first used commercially as a sweetened extract by Japan in 1970’s
- 200-300x sweeter by weight than sugarcane – can cultivate smaller area and be able to sweeten same amount
- Stevioside typically sold in powdered form
Historical Facts

- Use as a sweetener originated in Paraguay
- Used to cut out the bitter taste of yerba mate – native tea, high in caffeine
- By 1800’s stevia use had spread throughout South America
  - Domesticated in Brazil and Argentina
- Began to be cultivated commercially in the early 1900’s, was not much market value
- Rediscovered in 1960’s by Japan, began to produce the extract commercially
Native Paraguayan Usage

- Used as a sweetener and medicine for hundreds of years by the Paraguayan Guarani Indians
- Referred to the plant as “ka’a he’e”, meaning “sweet herb”
- Medicinal use was mainly for the treatment of diabetics
- Stevia would be accompanied with bitter tasting medicines to mask the taste
North American usage

- Used by diabetics as a sweetener, without seeing an increase in blood glucose
- Becoming more popular as a natural sweetener, Coca-Cola and PepsiCo have integrated into their products
Health Benefits

- Stevioside does not metabolize in the body, passes through digestive system without breaking down chemically - calorie free
- Improves glucose tolerance and insulin sensitivity
- Is non-cariogenic – will not cause tooth decay
- Anti-oxidant properties
Additional Information

- FDA still has not granted pure stevia leaves and extract as Generally Recognized as Safe (GRAS) due to limited toxicological information.
- Stevia market value estimate was $336 million US (2014) – projected to grow to $578 billion by end.
- Will not likely replace food crops due to its small role, but due its strong concentration, farmers can supplement as a cash crop.