Root Grinder

Grass Root Grinder Sketch Models

10/05/05

1: Separate

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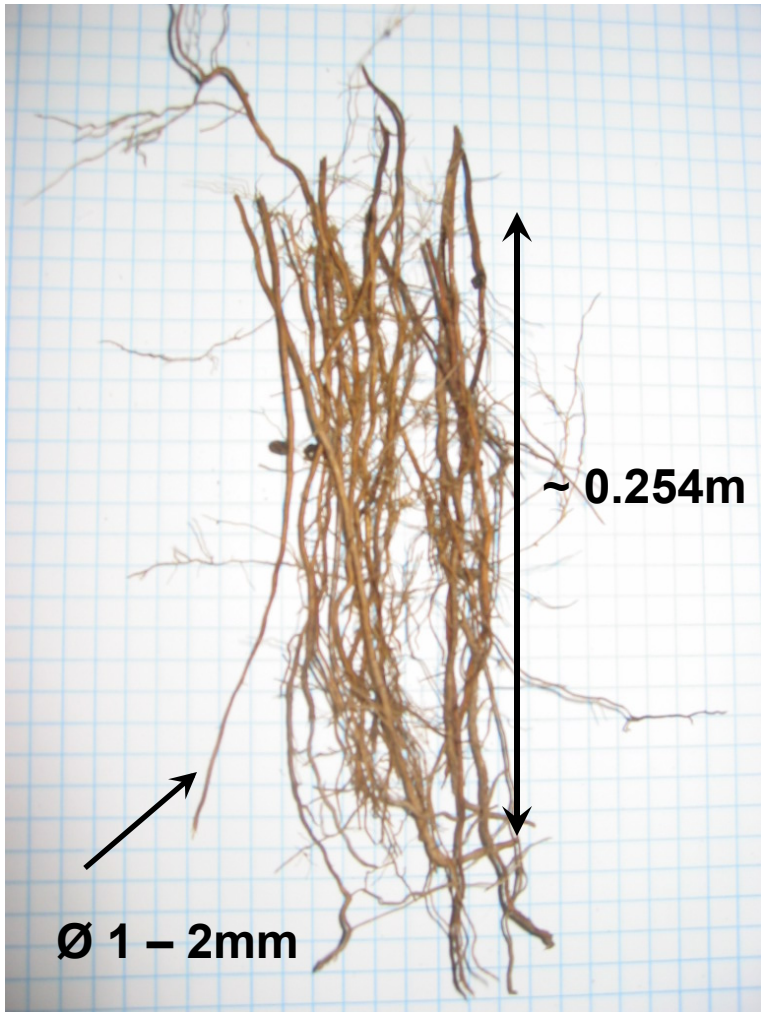
Background



- **Requirements:**
  - **Step 1:** Separate from dirt
  - **Step 2:** Chop/grinded into <1 cm length
  - **Step 3:** mix back in with separated dirt
  - 1 cm^3 fertilizer per plant

Design Challenges

Tumbler:

- Excess particles
- Tumbler Jams
- Integration

Design Challenges

Grinder/Cutter:

- Power

	Coffee Grinder (motor)	Bike (human power)
Speed:	~1,000 rad/sec	~720 rad/sec
Power:	200 Watts (max)	100 Watts

How It Fits Our Idea Area:

"Renewable or alternative energy and agriculture…"

fertilizer *reduces* energy consumption used to produce ammonia.

Background

- Customers/Market:

Customer	Market
Organic farmers	$7.8 billion dollar industry in US (2000)
Small farmers	2.1 million small farms (2002 USDA Census)
Farms in developing countries	88,000 metric tons of fertilizer used

Sources:

- **World Bank Group**

http://web.worldbank.org/WBSITE/EXTERNAL/NEWS/0,,contentMDK:20432940~menuPK:34480~pagePK:64257043~piPK:20432940~menuPK:34480~pagePK:64257043~piPK:437376~theSitePK:4607,00.html

http://www.ers.usda.gov/Briefing/Organic/

http://www.nass.usda.gov/census/

- **United States Census of Agriculture**

step=countries&ccID=10&theme=8&variable_id=196&action=select_

- **International Fertilizer Industry Association**

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http://www.fertilizer.org/ifa/statistics/indicators/ind_reserves.asp