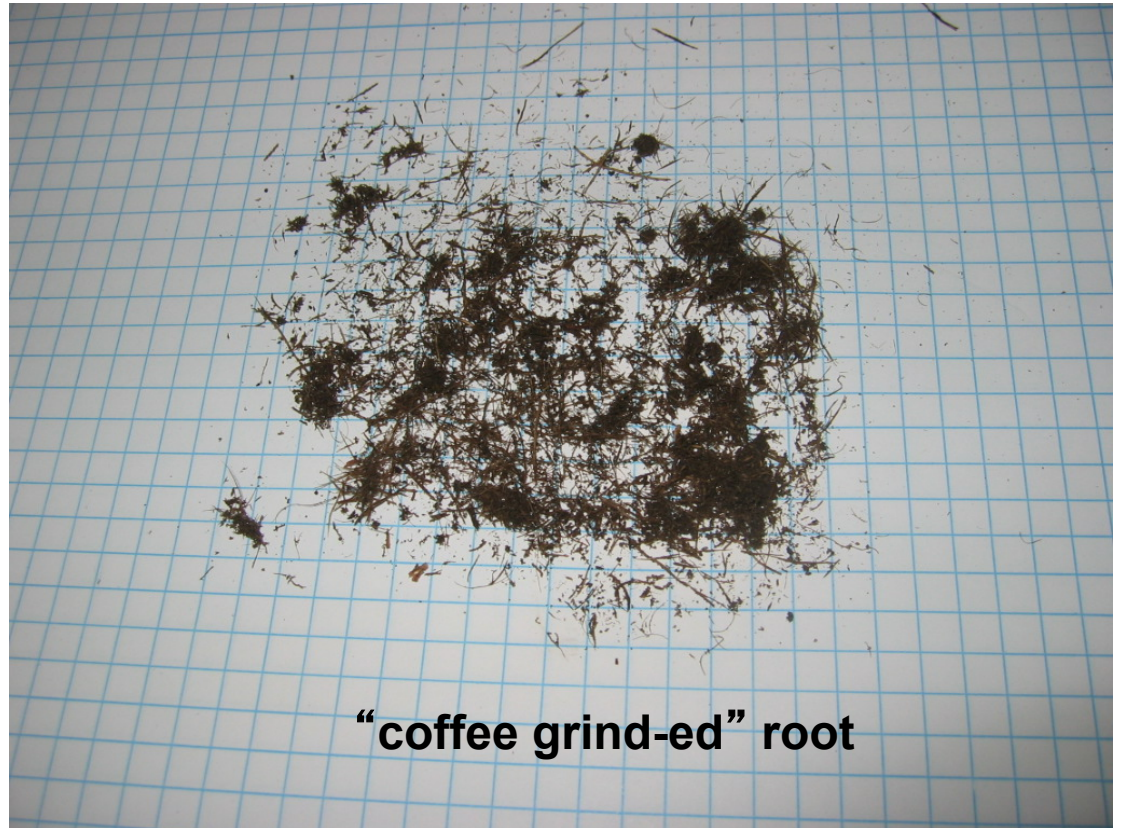


# Root Grinder



*Grass Root Grinder Sketch Models*

## 2: Grind/Cut

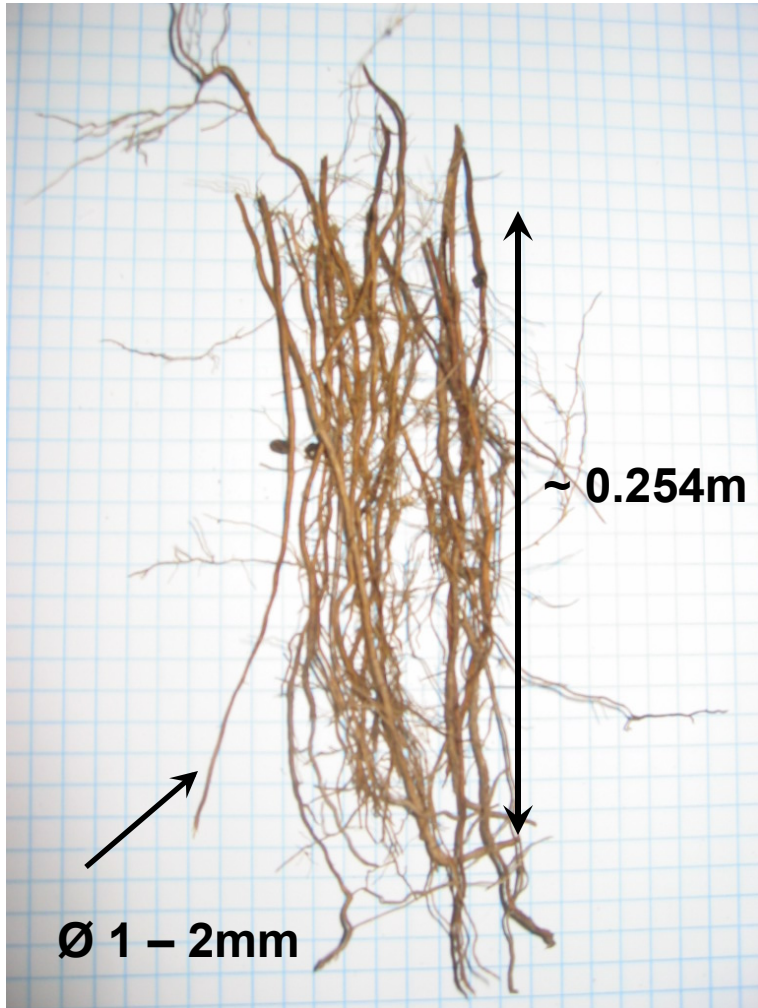




## 2: Grind/Cut



# Background



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



# Design Challenges

**Tumbler:**

**Tumbler:**



# Grinder/Cutter:

# Grinder/Cutter:

	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  
“Renewable agricultural” energy and*

Producing inoculum root as an alternative  
Fertilizing inoculum energy as an alternative  
used to produce energy consumption

# Background

- Customers/Market:

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



# Sources:

- **World Bank Group**

• **World Bank Group**  
<http://web.worldbank.org/WSITE/EXTERNAL/NEWS/0,,contentMDK:20432940~menuPK:34480~pagePK:64257043~piPK:437376~theSitePK:4607,00.html>

- **Economic Research Service (USDA)**

• **Economic Research Service (USDA)**  
<http://www.ers.usda.gov/Briefing/Organic/>

- **United States Census of Agriculture**

• **United States Census of Agriculture**

- **World Resources Institute**

• **World Resources Institute**

[step=countries&ccID=10&theme=8&variable\\_id=196&action=select](http://step=countries&ccID=10&theme=8&variable_id=196&action=select)

• [http://www.fertilizer.org/fif/statistics/indicator/ind\\_relation.asp](http://www.fertilizer.org/fif/statistics/indicator/ind_relation.asp)  
**International Fertilizer Industry Association**