

# **YIELD POTENTIAL OF NOVEL SEMI-DWARF GRAIN AMARANTHS TESTED FOR TENNESSEE GROWING CONDITIONS**



Damba Yahaya, Genetics and genomics laboratory

Advisor: Dr. Matthew Blair

# Introduction

- ▶ Grain amaranth (*Amaranthus* spp.)
  - ▶ Family: Amaranthaceae and
  - ▶ Genus: *Amaranthus*
  - ▶ Species: Approx. 70 species are available
    - 60 species are native to America
    - Rest are originated from Asia, Africa, Australia and Europe
    - Originating from warmer climates
- Amaranth is heat and drought resistant



# Important characteristics:

- C4 photosynthetic mechanism
- Adaptability to diverse eco-geographic situation
- Can grow in cold, drought and saline prone land
- High disease and insect resistance

# Justification

- ▶ Seeds are rich in protein(17-19% dry weight)
- ▶ **Double amount** of essential amino acids than wheat protein (Bressani et al., 1987)
- ▶ Comparatively **higher overall mineral content**- Calcium, Iron, Magnesium; Gluten free
- ▶ Seed or oil beneficial for people **suffering from hypertension, cardiovascular disease** (Kumari, 2013)
- ▶ Regular consumption **reduces blood pressure, cholesterol level and improves antioxidant status** (Gonor et al., 2006)

## Objectives

- ▶ To assess the grain yield and adaptability of three (3) genotypes of dwarf amaranths for **novel semi-dwarf grain amaranths tested for tennessee growing conditions**

# Uses:

Popped snack food, bread, muffin, pancakes, crackers, Alegria (Amaranth and honey bar)



# Materials and methods

- ▶ Tennessee State University Agricultural research station, Nashville, in 2015
- ▶ Three (3) amaranth cultivars, DB 3878, DB 3833 and DB 314 were evaluated
- ▶ Spacing of 25 cm x 60 cm with plot size of 3m<sup>2</sup>
- ▶ Plant population of 66, 667 plants/ha
- ▶ Seeds were nursed in the green house and transplanted by hand to establish 20 plants per plot.

- ▶ Experimental design was a randomized complete block (RCBD)
- ▶ Two rows per plot and 4 replications
- ▶ All plots were hand-harvested.
- ▶ Grain yield was determined for each plot.

# Other Parameters collected

- ▶ Number of Plants
- ▶ Plant Height
- ▶ Panicle Height
- ▶ Panicle weight
- ▶ Seed weight

## Data Analysis

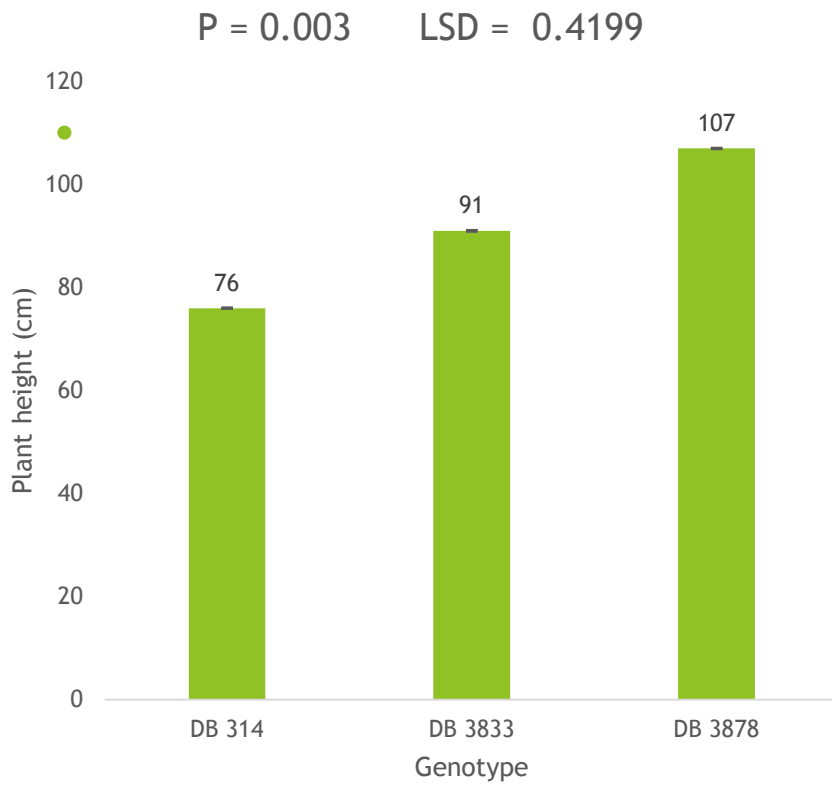
- Genstat software was used to analyze the data
- LSD 5% or 95% was used to separate means



# RESULTS AND DISCUSSION

|                        | DB 3878                          | DB 3833        | DB 314                            |
|------------------------|----------------------------------|----------------|-----------------------------------|
| Blade pigment          | Green                            | Green          | Green                             |
| Blade shape            | Oval                             | oval           | Truncate                          |
| Petiole pigment        | Pink                             | Green          | Green                             |
| Branching index        | All along stem                   | All along stem | All along stem                    |
| Flower color           | Amaranthine                      | Green          | Amaranthine                       |
| Inflorescence Shape    | Terminal with long side branches | Terminal       | Terminal with short side branches |
| Inflorescence Density  | High                             | High           | Medium                            |
| Inflorescence attitude | Erect                            | Erect          | Erect                             |
| Stem color             | Pink                             | Green          | Green base red stem               |





Corn wind barrier at end

Plant height can be compared to cowpea to the left and corn at end of block





Most landraces / head height  
breeding lines / knee  
height



Semi-dwarf



Normal height  
Breeding Lines  
Accessions

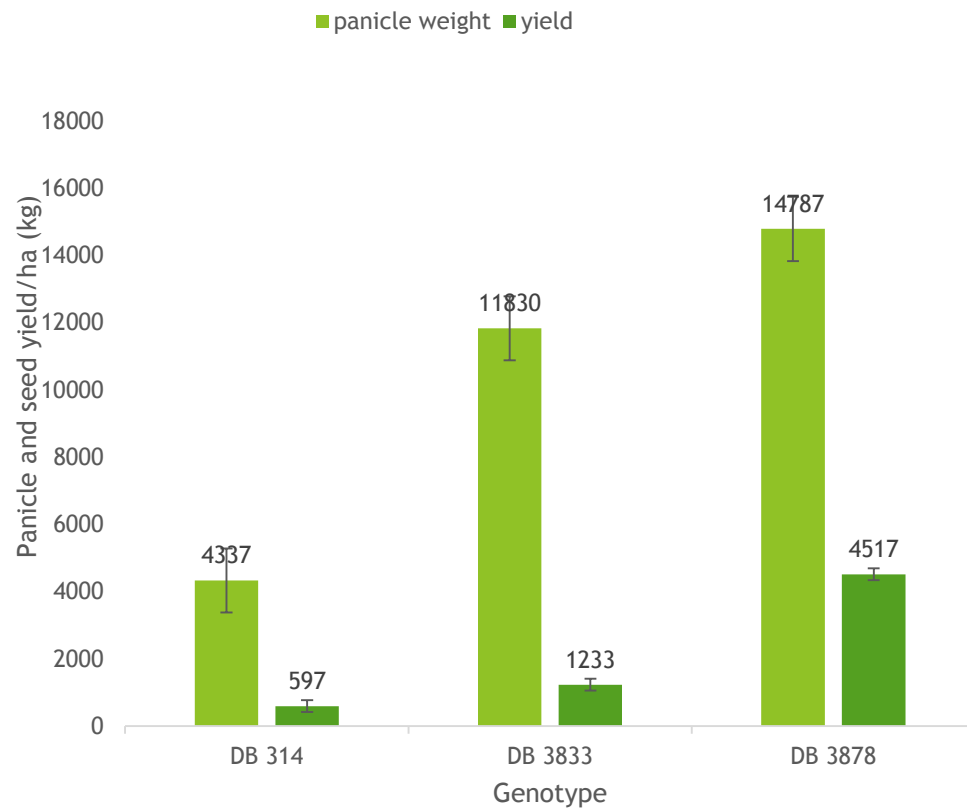


Semi-Dwarf

# Table1: Panicle height of Genotypes

| Genotypes | Panicle height | Measure of Dispersion |
|-----------|----------------|-----------------------|
| DB 314    | 36.58          | CV=16.3               |
| DB 3833   | 45.72          | SED=0.1563            |
| DB 3878   | 16.2           | P-Value = 0.228       |





$P < 0.001$  and  $LSD = 428.8$  seed yield  
 and  $LSD = 2329.8$  Panicle weight



# Conclusions

- ▶ Average plant height was 80cm
- ▶ Plant leaf features were similar
- ▶ Panicle weight and seed weight were significantly higher in DB 3878
- ▶ DB 3878 Performed better than other genotypes given an indication of better adaptation to Tennessee growing conditions
- ▶ Multi-locational trials should be carried out to assess impact of panicle weight on seed yield

# Thank you

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