Genetic and genomic resources for amaranth breeding to improve income and nutrition of resource-poor farmers

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Amaranth: a highly nutritious grain and vegetable crop

- *C-4 plant:* more tolerant to heat and drought
- *Rapid growth:* vegetable harvest 3 weeks after sowing
- *Highly nutritious:* rich in protein, Fe and Ca
- *High value crop:* generates income for smallholder farmers

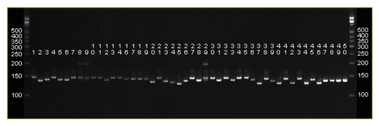
Constraints

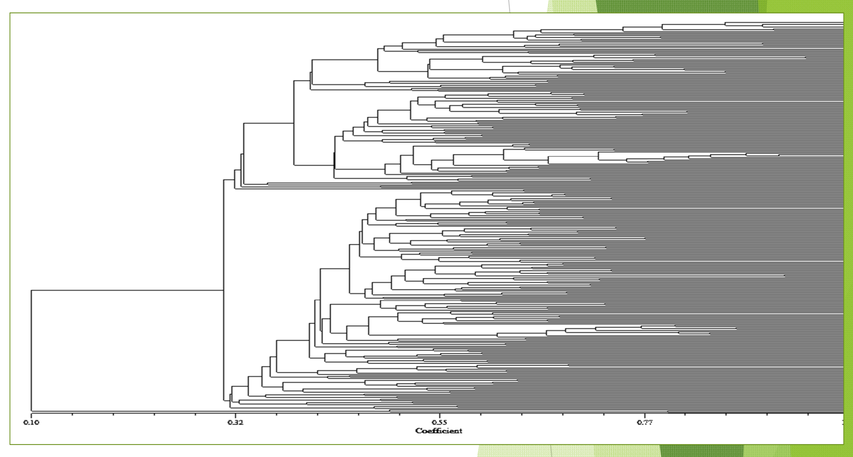
- Short shelf life limits marketability of vegetable amaranth
- Disease and pest susceptibility restricts quality and yield
- Antinutrients (hydrocyanic acid and oxalic acid) may restrict fresh consumption
- Difficult access to amaranth biodiversity and lack of breeding tools restricts development of improved cultivars combining disease resistance with quality traits

APPROACHES

Improve access to biodiversity

Morphologic, agronomic and molecular germplasm characterization, disease and pest resistance screening, nutritional analysis



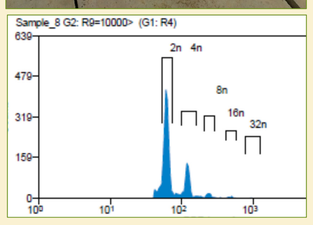


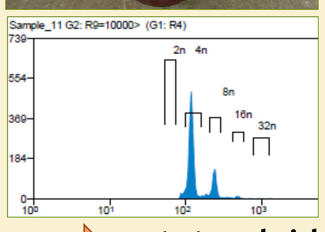
Breed improved varieties

Crossing techniques, hybridity markers, specialized populations for breeding and trait mapping

Broaden genetic diversity

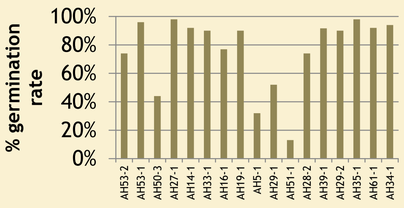
Polyploidization





diploid → polyploidization → tetraploid

Extended shelf life of 4n plants



Germination rate of 4n plants

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