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

Roland Schafleitner¹, Hoa Thi Le², Ray-yu Yang¹, Yun-yin Hsiao¹, Yen-wei Wang¹, Andreas Gramzow³ and Fekadu Dinssa³
E-mail: roland.schafleitner@worldveg.org

¹World Vegetable Center, PO Box 42, Shanhua, Tainan 74199, Taiwan
²Plant Resources Center, Vietnam Academy of Agricultural Sciences, Hanoi, Vietnam
³The World Vegetable Center, Eastern and Southern Africa, Duluti, PO Box 10, Arusha, Tanzania

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

Extended shelf life of 4n plants
Germination rate of 4n plants

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