Pearl Millet Research Activities At ISRA

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Introduction

Staple and subsistence food, 1st
Crop/cultivated areas, by 90% of the rural
population, tolerant to drought

How to increase productivity and better
promote the value chain?

- Molecular tools for selection / varietal
  improvement
- its high nutritional value
- its potential to access new markets
Generate innovative knowledge and technologies (varieties, hybrids, practices) that contribute to the improvement of production in the face of global changes (anthropogenic and climatic)

- Accurate selection and accelerated improvement of better adapted and more productive millet varieties in West African rural agrosystems
- Promotion of environmentally sustainable and resilient intensive practices
**Current Activities**

- **Biodiversity/Genetic/Genomics**
  - Germplasm Characterization
  - Wild/Cultivated Introgressions
  - Population Genomic
  - GWAS and GEBV

- **Agronomy and Soil sciences**
  - Yield gap reduction by optimizing plant density according to rainfall and soil fertility gradient
  - Improvement of soil fertility using compost
  - Ecological intensification through inter-cropping

- **Breeding activities**
  - Development of inbred lines, top cross hybrids and population varieties adapted to different agro-ecological zones
  - Evaluation of different varieties and lines for high yielding and high micronutrient contents
  - Breeding for dual purpose millet

- **Crop protection**
  - Integrated agroecological management of head miner
  - Screening of lines for head miner and downy mildew resistance
  - Production of diets for high level female of *Bracon hebetor*
  - Offspring production for release program with farmers
Key Achievements/Outputs

Biodiversity and Genomic
- Core collection
- Reference genome
- SNPs in wild and cultivated lines
- QTLsGenes linked to drought stress, downy mildew, roots exudation, biomass, oxydative stress, micronutrients,
- Modeling of pearl millet diversity evolution and adaptation to rainfall forecasts by 2050

Breeding
- Top cross hybrids developed using local population
- Extra-early inbred lines with long panicles head developed
- Combining ability of downy mildew resistant lines determined
- Establishment of a core collection

Agronomy and Soil
- Optimization of mineral and organic fertilizer for pearl millet
- Improvement of plant density for Souna 3 and Thialack 2
- Agronomic diagnosis reveals that millet responds well to mineral fertilization, there are optimum thresholds beyond which fertilizer is no longer profitable

Crop Protection
- Varieties resistant to head miner, stem borer and downy mildew identified
- Impact of farmers’ practices on the incidence and behavior of the head miner
- Egg parasitoid for the head miner identified (Trichogrammatoidea armigera), to be mass reared for release at farmer fields
- Optimal release timing for Bracon hebetor for the biocontrol of head miner
Future Goals

Accurate selection and accelerated improvement of varieties / hybrids that are more tolerant and perform better under erratic conditions of rainfall and soil poverty.

Increased production and productivity of the millet sector in Africa and elsewhere.

Access to new markets, increased income and improved well-being of rural populations.
Constraints/Needs to move forward

- Lack of coordination
- Chase Projects
  Opportunities

ONE BREEDING PROGRAM, TWO STRATEGIES

NEXT GENERATION/RELEASE OF PM

Hybrids

OPVs
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