Sorghum hybrids for enhancing crop productivity in the drylands of Ethiopia
Tamirat Bejiga, Habte Nida, Alemu Tirfessa, Amare Seyoum, Adeyanju O. Adedayo, Nathan Daniel Bowser, Patrick J. Rich, and Gebisa Ejeta

Introduction

• Hybrid cultivars yield higher and tolerate environmental stresses better than inbred varieties and are thought to enhance resilience to climate change.
• Hybrids can strengthen seed supply value chain and encourage the development of commercial seed supply system.

Demonstration of released hybrids in Ethiopia

Figure 1. Demonstration of ESH5, a hybrid released during SMIL phase I, Farmers’ field, Mieso 2021, Western Hararghe, Ethiopia

Figure 2. ESH4 hybrid demonstration, Farmers’ field, Mieso October 2021, Western Hararghe, Ethiopia

• As part of SMIL project, introduction and testing of parental lines and hybrids from public breeding programs in the US and other sources have been conducted in Ethiopian dry lowlands.

Methods

• During the years from 2017 to 2022, sets of elite drought tolerant hybrids were evaluated across three regions (Oromia, Amhara and Tigray), with 1-2 locations within each of the regions.
• Candidate hybrids that showed best adaptation to drought environments and with high yield potential were further evaluated on wider plots.
• Food processing quality and seed production test were conducted on the candidate hybrids.

Results

• Sorghum hybrids K7148 and K19020 showed high yield potential and adaptation to drought environment. K7148 resulted in 26 and 38% higher grain yield than the best-yielding (Argiti) and widely adapted (Melkam) respectively.

![Graph showing yield potential of candidate drought tolerant hybrids based on wide plot test.]

Figure 3. Grain yield potential of candidate drought tolerant hybrids evaluated on wide plots at Mieso, Ethiopia in 2022

• Compared to the widely adapted high yielding check – Melkam, the best candidate hybrid (K7148) resulted up to 37% higher grain yield under a dryland environment.

![Graph showing yield of drought tolerant test hybrids – 2021 Mieso, Ethiopia.]

Figure 4. Grain yield potential of drought tolerant hybrids evaluated under dryland environment at Mieso, Ethiopia in 2021

Injera making property of candidate hybrids

<table>
<thead>
<tr>
<th>Hybrids</th>
<th>Injera sensory (1-9 scale)</th>
</tr>
</thead>
<tbody>
<tr>
<td>K19020 (Candidate)</td>
<td>7.0</td>
</tr>
<tr>
<td>K7148 (Candidate)</td>
<td>6.5</td>
</tr>
<tr>
<td>ESH5 (Check)</td>
<td>7.0</td>
</tr>
<tr>
<td>ESH4 (Check)</td>
<td>6.5</td>
</tr>
</tbody>
</table>

Injera sensory scale: 1 = poor; 9 = excellent