CIMMYT Durum and Bread Wheat Multilocational Trial

Executive Yield Performance Overview

2.68	5.60	15.4%	13	3	39
Average Yield (MT)	Max Yield (MT)	High Yield %	Entry Count	Replication	Total Plot

Yield Category Distribution

Grain Yield Distribution (t/ha)
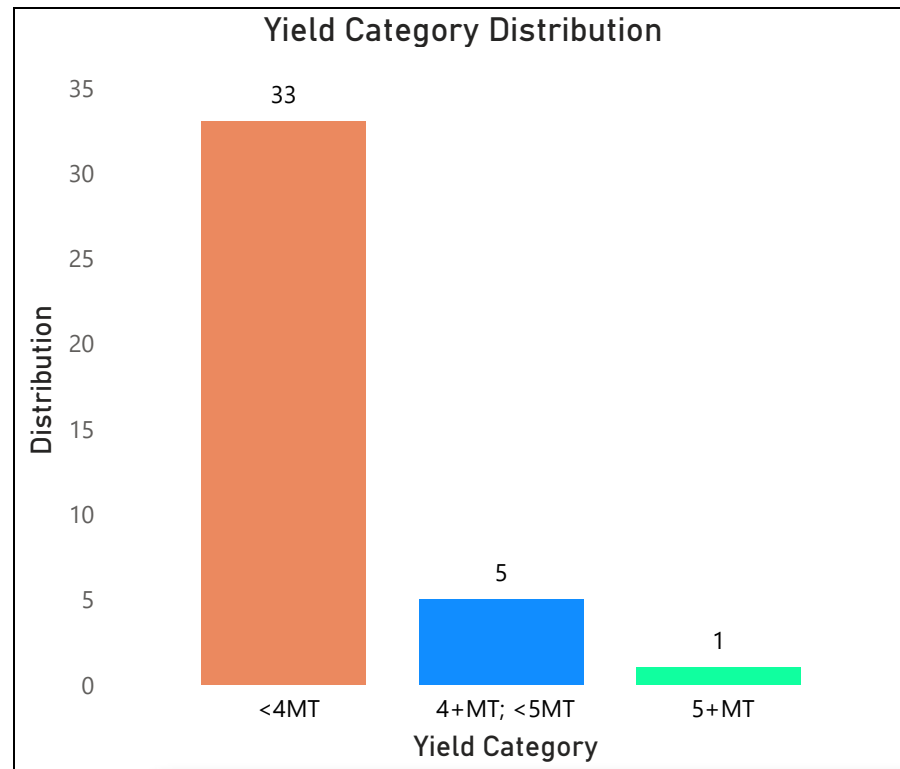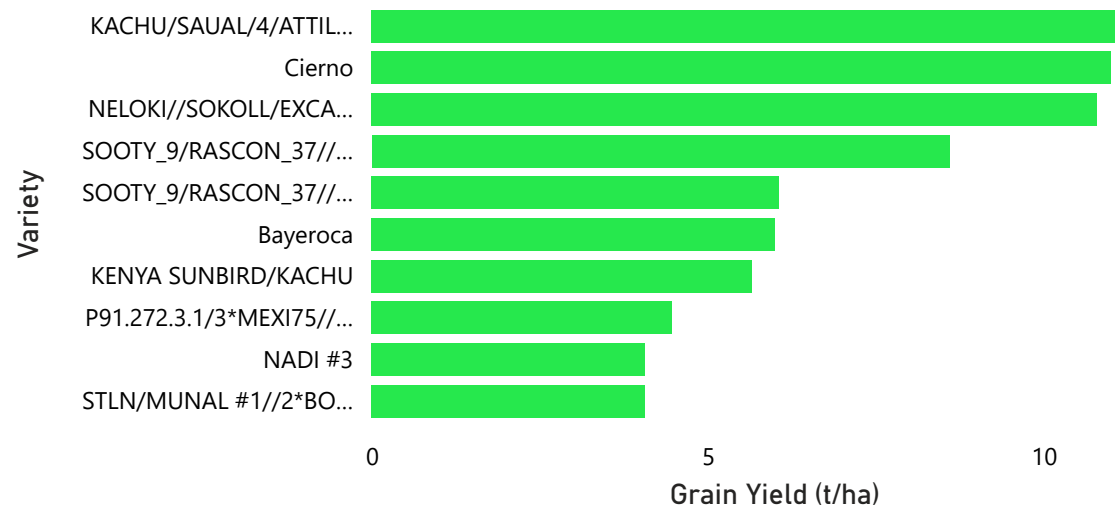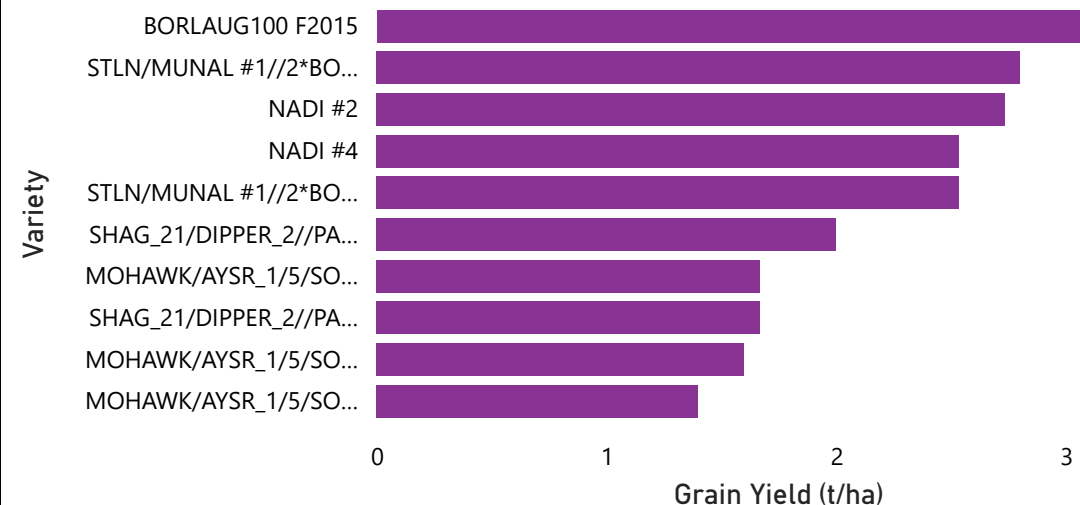
Most wheat genotypes yielded below the 4 t/ha benchmark, with only a small proportion demonstrating high yield potential. This highlights a narrow pool of promising varieties for further evaluation and selection.

Genotypes Performance

Top 10 Yielding Genotypes

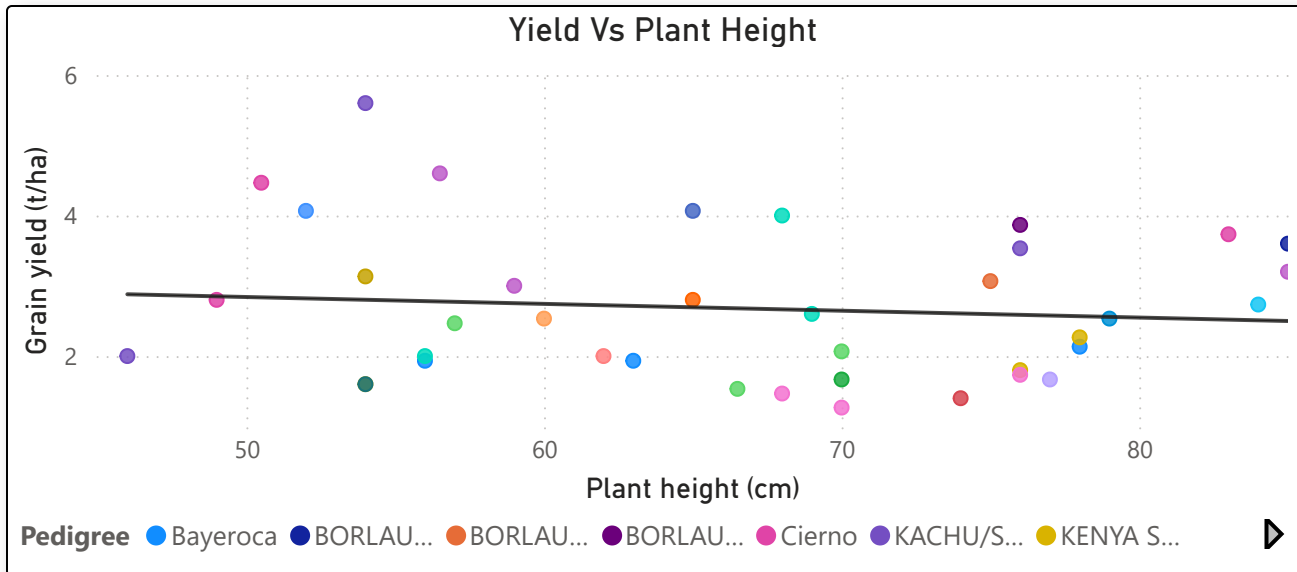Bar chart (Variety vs Grain Yield (t/ha)):
- KACHU/SAUAL/4/ATTIL...
- Cierno
- NELOKI//SOKOLL/EXCA...
- SOOTY_9/RASCON_37//...
- SOOTY_9/RASCON_37//...
- Bayeroca
- KENYA SUNBIRD/KACHU
- P91.272.3.1/3*MEXI75//...
- NADI #3
- STLN/MUNAL #1//2*BO...

Bottom 10 Yielding Genotypes

Bar chart (Variety vs Grain Yield (t/ha)):
- BORLAUG100 F2015
- STLN/MUNAL #1//2*BO...
- NADI #2
- NADI #4
- STLN/MUNAL #1//2*BO...
- SHAG_21/DIPPER_2//PA...
- MOHAWK/AYSR_1/5/SO...
- SHAG_21/DIPPER_2//PA...
- MOHAWK/AYSR_1/5/SO...
- MOHAWK/AYSR_1/5/SO...

Pedigree	Grain yield (t/ha) ▼	Yield Category
KACHU/SAUAL/4/ATTILA*2/PBW65//PIHA/3/ATTILA/2*PASTOR	5.60	5+MT
NELOKI//SOKOLL/EXCALIBUR	4.60	4+MT; <5MT
Cierno	4.47	4+MT; <5MT
NADI #3	4.07	4+MT; <5MT
STLN/MUNAL #1//2*BORL15	4.07	4+MT; <5MT
SOOTY_9/RASCON_37//GUAYACA/NINIA/3/BSET/PNIO_3/4/PLATA_7/ILBOR_1//	4.00	4+MT; <5MT
BORLAUG100 F2016	3.87	<4MT
Cierno	3.73	<4MT
BORLAUG100 F2014	3.60	<4MT
KACHU/SAUAL/4/ATTILA*2/PBW65//PIHA/3/ATTILA/2*PASTOR	3.53	<4MT
NELOKI//SOKOLL/EXCALIBUR	3.20	<4MT
SHAG_21/DIPPER_2//PATA_2/6/ARAM_7//CREX/ALLA/5/ENTE/MEXI_2//HUI/4/YAV_1/4	3.13	<4MT

Yield performance is highly concentrated among a small number of genotypes, with most entries clustering below 4 t/ha. This indicates limited overall yield potential across the trial population. Future evaluations should prioritize high-performing genotypes for multi-environment validation while phasing out consistently low-yielding entries to optimize research efficiency and resources.

Agronomic Drivers

Yield Vs Plant Height

Pedigree ● Bayeroca ● BORLAU... ● BORLAU... ● BORLAU... ● Cierno ● KACHU/S... ● KENYA S...

0.77

Plant Height Vs Grain Yield Correlation Coefficient

Yield Vs Spikes Per M²

Pedigree ● Bayeroca ● BORLAU... ● BORLAU... ● BORLAU... ● Cierno ● KACHU/S... ● KENYA S...

0.89

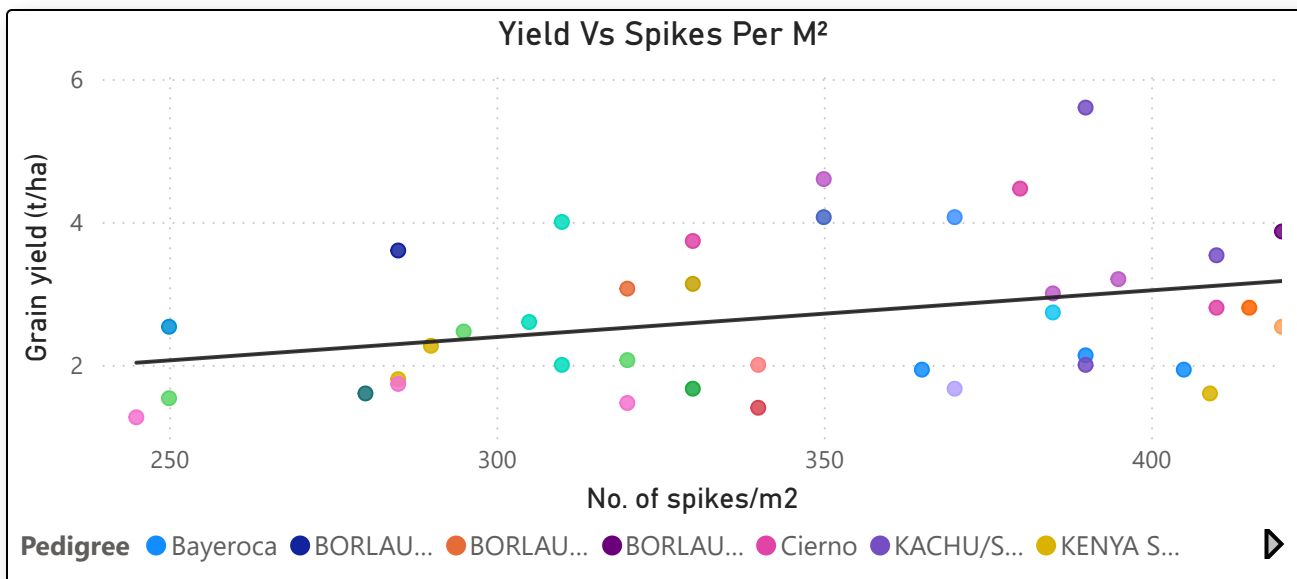*No. of Spikes per M2 Vs Grain Yield Correlation Coefficient*

Trend analysis indicates weak-to-moderate relationships between yield and individual agronomic traits, reinforcing the need for multi-trait selection in genotype evaluation.

@Yield Vs Plant Height:
The trend line indicates a weak positive relationship between plant height and grain yield. While extremely short plants tend to underperform, increased height beyond a moderate range does not consistently translate into higher yield.
Extremely short plant stature is generally associated with **lower yield potential**. **Very tall plants** has **no guarantee of high yield**. Optimal yield appears around **moderate plant height.**
Recommendation: 1. Avoid selecting genotypes based on height alone. **2.** Focus on **balanced plant architecture**, not extremes.
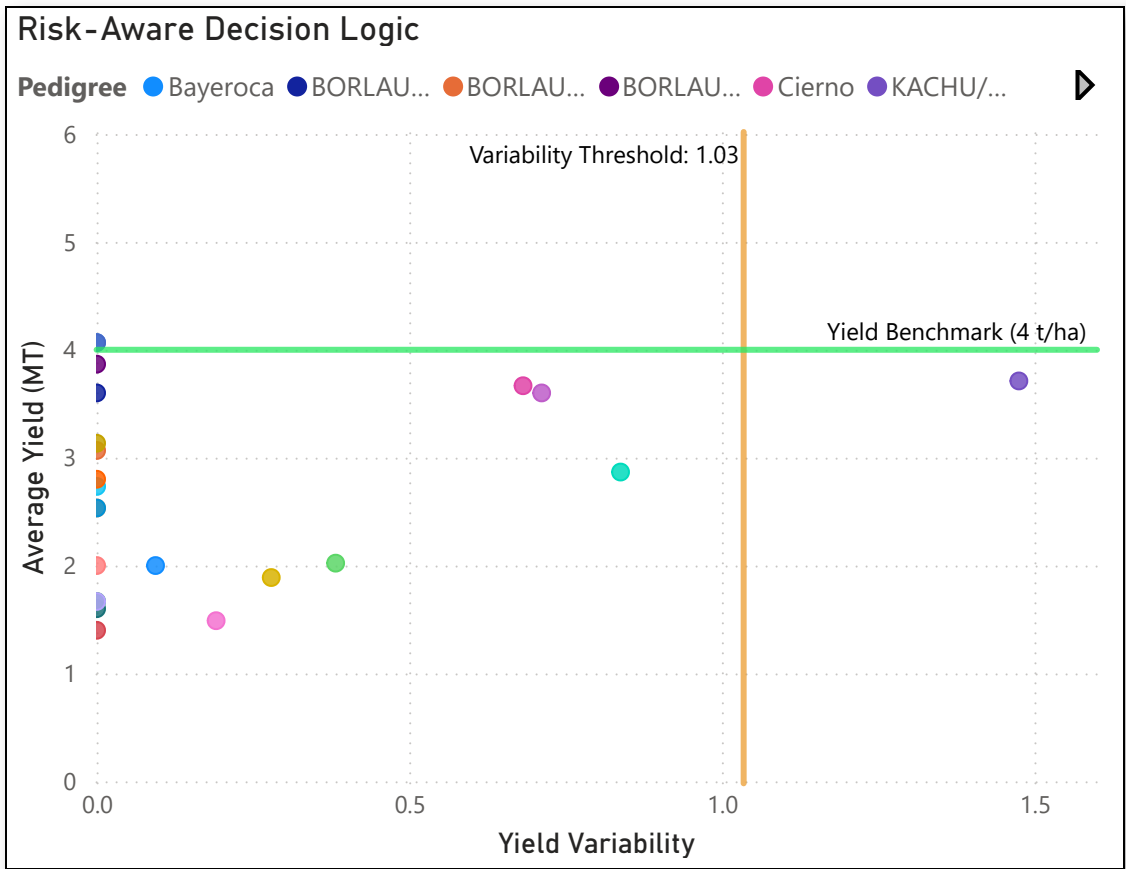
@Yield Vs Spikes Per M²:
Spike density shows a stronger positive association with grain yield compared to plant height, suggesting it is a more influential yield component. However, diminishing returns are observed at very high spike densities. Spike density matters more than height, but excessive spikes may lead to Competition for nutrients, Smaller grains and Yield plateau.
Recommendation: 1. Prioritize genotypes with **optimal spike density**. **2.** Combine spike count with grain size and maturity traits.

@Summary & Conclusion: Scatter plot analysis

Risk-Aware Decision Logic

Risk-Aware Decision Logic

Pedigree 🔵 Bayeroca 🔵 BORLAU... 🟠 BORLAU... 🟣 BORLAU... 🔵 Cierno 🟣 KACHU/... ▷

Variability Threshold: 1.03

Yield Benchmark (4 t/ha)

Y-axis: Average Yield (MT), X-axis: Yield Variability

💡 Stability analysis indicates that only a limited subset of high-yielding genotypes also demonstrate low yield variability, identifying them as reliable candidates for advancement. Several high-yield entries exhibit elevated variability, suggesting sensitivity to environmental or management conditions and warranting further evaluation. Selection decisions should prioritize genotypes combining strong yield performance with consistency to maximize trial efficiency and reduce risk.

Quadrant Hint

Quadrant	Meaning	Decision
Top-Left	High yield, low variability	⭐ Advance immediately
Top-Right	High yield, high variability	Test further (risky)
Bottom-Left	Low yield, low variability	Stable but weak
Bottom-Right	Low yield, high variability	Drop

🟩 **Top-Left (High Yield • Low Variability)**
Meaning
• High performing
• Consistent
• Reliable across observations
Decision
→ **Advance immediately**
These are your **elite, dependable genotypes**.

🟨 **Top-Right (High Yield • High Variability)**
Meaning
• High potential
• Inconsistent
• Environment-sensitive
Decision
→ **Retest / manage risk**
Good candidates, but **not yet safe**.

🟦 **Bottom-Left (Low Yield • Low Variability)**
Meaning
• Consistent but weak
• Predictably low
Decision
→ **Low priority / niche use.**

🟥 **Bottom-Right (Low Yield • High Variability)**
Meaning
• Poor performance
• Unreliable
Decision
→ **Drop early**

@Key-Takeaway:
*Prioritize the rare genotypes that deliver high yield with low inconsistency (top-left quadrant ["**STLN/MUNAL #1//2*BORL15**"]) for immediate advancement. These are your low-risk, high-reward elite performers.
*Consider dropping genotypes that deliver low yield with high inconsistency (bottom-right quadrant ["**KACHU/SAUAL/4/ATTILA*2/PBW65//PIHA/3/ATTILA/2*PASTOR**"]) to optimize and maximize efficiency while reducing risk.
*Reserve resources for cautious further testing of

Extra Insights

*Scarcity of Truly Elite Genotypes: The sparse population in the top-left quadrant highlights that combining high yield with stability is rare. These few points represent the most reliable advancement candidates — "dependable genotypes" that reduce risk in breeding pipelines.

*Trade-Off Between Yield Potential and Stability: Several high-yielding entries sit in the top-right, indicating strong performance in favorable conditions but vulnerability elsewhere. This supports the dashboard's "test further (risky)" recommendation — good candidates but not yet safe for immediate scaling.

*Risk Concentration in High Performers: High-yield genotypes disproportionately show elevated variability compared to low-yield ones. This suggests environmental/management sensitivity is a bigger issue for top performers, aligning with the bottom text note about limited stable high-yielders.

*Efficiency Opportunity in Selection: Many entries fall into "drop" or "low priority" zones (bottom quadrants). Early elimination here could streamline trials, focusing resources on the top half (especially top-left).

*Strategic Prioritization: The framework rewards balance — pure yield chasing risks instability. Decisions should weight consistency heavily to maximize long-term reliability and trial efficiency.

Pedigree	Yield Variability	Grain yield (t/ha)	A
STLN/MUNAL #1//2*BORL15	0.00	4.07	
KACHU/SAUAL/4/ATTILA*2/PBW65//PIHA/3/ATTILA/2*PASTOR	1.48	2.00	
KACHU/SAUAL/4/ATTILA*2/PBW65//PIHA/3/ATTILA/2*PASTOR	1.48	3.53	
KACHU/SAUAL/4/ATTILA*2/PBW65//PIHA/3/ATTILA/2*PASTOR	1.48	5.60	