**Activity 2: Advance breeding populations for resistance to blast, striga and drought; high nutrient content and desired traits like snapping quality and none-logging**

**Objective and intended output**:

**Materials and methods**: Breeding populations at F2, F3 and F4 for the different traits were established in the field for evaluation and the selected ones advanced. At the same time new F1 populations are being made for advancing to F2 the next season. A PYT trial consisting of 81 selections from crosses and promising accessions was evaluated at Kiboko and Alupe

**Results and interpretation**:

The following populations were advanced in the course of the year: 2498 F3 lines for diverse traits (Yield, Blast, Striga, drought, high nutrient content, snapping trait, head shape and size, grain color); 158 F3 & 95 F2 lines for blast resistance; 94 F2 lines for striga resistance;192 F3 lines for high nutrients; 514 F4, 30 F3 & 58 F2 lines for snapping trait; 1955 F1 lines for diverse traits. In addition more crosses were made.

For PYT, plant height, days to flowering (DAP), 1000 seed weight were highly significant (P<0.001); number of productive tillers per plant, dry biomass and grain yield were significant (P<0.05), while threshability was not significant (Table 1). All except three entries had agronomic score above or equal to average (1-3). DAP ranged from 89-108 days with IE 2047 (88.5 days), IE 2476 (89 days) and IE 7470 (90 days) registering the lowest days. High yield was estimated and ranged from 1.4 to 5.1 t/ha. Best five yielders were IE 2064 5.1, IE 2047 5.0, IE 667 4.7, SDFM 1702 4.7, IE 3075 4.5 AND P224 x KNE 628-P4-1 (#33) (4.4 t/ha). The best 25 entries will be advanced to advanced yield trial (AYT).

Table 1: Table of means of the 20 best yields from the 81 entries evaluated at PYT at ICRISAT Kiboko and Alupe during the 2016.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Genotype | Agronomic Scorea | Plant Heightb | DAPc | Tillersd | Biomasse | Thresh-abilityf | Grain Yieldg | 1000 grain weighth |
| IE 2062  | 2 | 82 | 100 | 5 | 3.1 | 76.5 | 5.1 | 3.5 |
| IE 2047  | 2 | 75 | 89 | 2 | 3.1 | 70.8 | 5.0 | 3.2 |
| IE 667  | 2 | 80 | 98 | 6 | 3.1 | 63.0 | 4.7 | 3.1 |
| SDFM 1702  | 1 | 83 | 95 | 3 | 2.2 | 67.7 | 4.7 | 2.6 |
| IE 3075  | 3 | 63 | 95 | 4 | 2.3 | 75.0 | 4.5 | 2.6 |
| P224 X KNE 628-P4-1 (#33)  | 2 | 102 | 96 | 2 | 3.0 | 72.4 | 4.4 | 2.8 |
| IE 2430  | 3 | 103 | 93 | 2 | 1.9 | 75.8 | 4.3 | 3.1 |
| IE 6726  | 3 | 79 | 102 | 5 | 3.2 | 62.1 | 4.2 | 2.7 |
| IE 3910  | 2 | 93 | 98 | 2 | 2.5 | 67.0 | 4.1 | 2.2 |
| 62-H1-1  | 1 | 103 | 97 | 3 | 3.5 | 61.3 | 4.1 | 2.5 |
| IE 6025  | 3 | 79 | 91 | 3 | 2.8 | 70.8 | 4.0 | 2.6 |
| IE 7470  | 2 | 90 | 91 | 2 | 3.1 | 68.7 | 4.0 | 2.8 |
| 78-H2-1  | 3 | 108 | 100 | 2 | 2.3 | 72.5 | 3.9 | 2.2 |
| IE 6877  | 3 | 77 | 96 | 3 | 1.8 | 58.7 | 3.9 | 2.3 |
| 68-H4-1  | 2 | 100 | 100 | 2 | 2.1 | 74.8 | 3.8 | 2.8 |
| IE 2790  | 4 | 96 | 105 | 4 | 2.7 | 57.5 | 3.8 | 2.5 |
| 64-H2-1  | 2 | 101 | 97 | 2 | 2.7 | 64.1 | 3.8 | 2.6 |
| 40-H4-1  | 2 | 103 | 98 | 2 | 2.7 | 68.1 | 3.7 | 2.4 |
| 41-H5-1  | 1 | 97 | 96 | 2 | 3.1 | 53.4 | 3.7 | 2.5 |
| IE 2644  | 2 | 76 | 100 | 3 | 1.7 | 59.0 | 3.6 | 3.5 |
| Meani | 1.5 | 94.2 | 98.3 | 2.0 | 2.3 | 63.2 | 3.1 | 2.5 |
| Probj | - | <0.001 | <0.001 | 0.03 | 0.05 | 0.54 | 0.02 | <0.001 |
| LSDk | - | 19.4 | 6.5 | 2.7 | 1.4 | 24.6 | 1.8 | 0.7 |
| CVl | - | 10.4 | 3.3 | 32.1 | 31.0 | 19.5 | 21.0 | 13.4 |

 aGenerally appearance of the plant score on plot basis on a scale of 1-5 (1=very good, 5=very poor); bPlant height in cms; cDays from planting to 50% flowering score on plot basis; dNumber of productive tillers per plant; eDry above ground biomass in t/ha; fRation of grain and panicle weight; gGrain yield in t/ha; hWeight of 1000 grains in gms; iMean of the 81 entries; jF probability; kLeast significant difference, lCoefficient of Variation

**Next steps:** The lines will be advanced to the next generation. Those at F4 will be advanced to the preliminary yield trial (PVS). Additional crosses will be made using the parents identified from the germplasm characterization and nutrient profiling. Three and four way crosses will be made from the excellent lines at the different stages.