COMMERCIAL HYBRID GRAIN SORGHUM "YUMA ROOT ROT" DISEASE REACTIONS AND AGRONOMIC EVALUATIONS AT UNIVERSITY OF ARIZONA YUMA AGRICULTURAL CENTER 1983

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Abstract

One hundred twelve commercial hybrid grain sorghums were evaluated for degree of resistance to the Yuma Root Rot of double cropped grain sorghum in the Yuma area. Nine were found to be quite resistant. Thirteen appeared to possess reasonably good resistance with another thirteen hybrids showing a lower level of resistance. The remaining 77 hybrids showed very poor resistance up to total susceptibility.

Introduction

A root rot of late planted (double crop) grain sorghums has been a problem for growers in the lower Colorado River area for many years. It was first observed in the late 1960's. This problem of plants appearing moisture stressed with rolled leaves in spite of adequate soil moisture has resulted in very low yields, 100% lodging in some cases, to complete grain yield loss. The incidence of root rot has been light in some years.

A full identification and description of this root rot has not yet been developed. However research by the sorghum project soon after the problem was observed discovered that very clear cut genetic resistance to this root rot can be found in sorghum. Resistance has been determined to be recessive in genetic combination with susceptibility so resistant genotypes are in the minority.

Materials and Methods

One hundred twelve different commercial hybrid grain sorghums were evaluated for this root rot in 1983. The entries were planted in moisture on August 23, 1983 in six foot plots and replicated two times. When planted this late in the season, the disease seems to be most severe and attacks the roots of susceptible genotypes while they are still in the seedling stage. Totally susceptible genotypes may die while still in this seedling stage making evaluations quite easy.

The entries were evaluated for Yuma Root Rot Disease and were also given an Agronomic Evaluation as follows:

Yuma Root Rot Disease Scoring:

1 = All plants resistant and healthy
2 = Some plants did not look perfectly healthy but probably all resistant
3 = Segregating for both diseased and healthy plants
4 = No healthy plants, all diseased or dying

5 = All plants dead or near dead
Agronomic Evaluation:

1 = All plants healthy
2 = 66 to 99% of plants healthy
3 = 36 to 65% of plants healthy
4 = 1 to 35% of plants healthy
5 = 0% of plants healthy

Results

The full Yuma Root Rot evaluation and Agronomic evaluation for each entry are not presented here. For simplicity the scores have been combined into five groups from which the interested grower can readily select resistant sorghums.

The five sorghum hybrid sorghums listed under Group I appeared to be completely resistant in our evaluations. The four hybrids listed in Group II appeared to be almost completely healthy and perhaps could be considered to be fully resistant.

Group III hybrids had a definite mix of healthy and diseased plants (Disease score = 3.0) with 60 to 99% of the mix being disease resistant and healthy. Potential grain yield under disease conditions could be quite good.

Group IV hybrids had a definite mix of healthy and diseased plants (Disease score = 3.0) with only about half being disease resistant. Potential grain yield under disease conditions would be quite low.

Group V hybrids varied from a mix of healthy and diseased plants (Disease score = 3.0) to no healthy plants (Disease score = 4.0 to 5.0). Agronomic scores ranged from 3.5 to 5.0 showing few or no healthy plants. Yield potential could be zero under disease conditions.

Group I: All plants disease free and healthy - Disease score = 1.0, Agronomic score = 1.0.

DEKALB DK42Y	PIONEER X5325
FUNKS HW5972	PIONEER X5426
PIONEER 8222	

Group II: Disease score = 2.0, Agronomic score = 1.5.

PIONEER 8300	RING-AROUND RA X795
PIONEER 8333	SEEDTEC WAC 692R

Group III: Disease score = 3.0, Agronomic score = 2.0 to 2.5.

ASGROW H8107	NK 2189	TAYLOR-EVANS Y101G
ASGROW OPAL	PIONEER 8680	TWO 60D
ASGROW TOPAZ	RING-AROUND RA747	TWO 62YG
FUNKS HW6275	SEEDTEC WAC 692	
GROAGRI GSA1310A	SEEDTEC WAC 710DR	

Group IV: Disease score = 3.0, Agronomic score = 3.0.

ASGROW H804
DEKALB DK59E
FERRY MORSE GT565
FUNKS G1498
FUNKS G1711
NK 2660
PIONEER 8657
RICHARDSON Y303A
SEEDTEC WAC D701G
STAUFFER 734GR
TAYLOR-EVANS DINERO
TWO 64YG
YOUNG EARLY ORO G

Group V:

Disease scores of 3.0 through 4.5, Agronomic scores of 3.5 through 5.0.

ASGROW COLT
ASGROW CORRAL
ASGROW DOUBLE TX
ASGROW H768
ASGROW RUBY
BROWNING #1
BROWNING #2
BROWNING #3
CONLEE PRONTO
CONLEE QUICKEE
CONLEE RAWHIDE
CONLEE TOPHAND TA
CONLEE TOPHAND II
DEKALB DK46
DEKALB DK57
DEKALB DK64
DEKALB DK69
FERRY MORSE GT475
FERRY MORSE GT585
FUNKS G525 DR
FUNKS G550
FUNKS G611
FUNKS G1400
FUNKS HW5449
FUNKS HW6016
GROAGRI GSA1212
GROAGRI GSA1290
GROAGRI GSA1299
NC+ 160
NC+ 165
NC+ 174
NC+ 178
NC+ 271
NK 265
NK 2778
PIONEER 8199
PIONEER X5328
RICHARDSON Y112A
RICHARDSON Y322A
RICHARDSON Y344
RING-AROUND RA433A
RING-AROUND RA787
RING-AROUND RA X1805
RING-AROUND RA X1806
RING-AROUND RA X1807
SEEDTEC E 110
SEEDTEC WAC 651DR
SEEDTEC WAC 652G
SEEDTEC WAC 692G
SEEDTEC WAC 694G
SEEDTEC WAC 715DR
SEEDTEC WAC 716DR
SEEDTEC WAC 1002
SEEDTEC WAC 2003
SEEDTEC SX 827504
STAUFFER 515GR
STAUFFER 530GR
STAUFFER 535GR
STAUFFER S9533
STAUFFER S9536
STAUFFER S9750
TAYLOR-EVANS Y44R
TAYLOR-EVANS Y60
TAYLOR-EVANS Y77
TAYLOR-EVANS 8163
TWO 48YG
TWO 50YG
TWO 54YG
TWO 70D
TWO 80D
YOUNG ORO EXP 8102
YOUNG ORO DOUBLE XTRA
YOUNG ORO G
YOUNG ORO G XTRA #1
YOUNG ORO G XTRA #2
YOUNG ORO PRONTO
YOUNG ORO RECIO