Selecting for and Improving Chickpea Disease Resistance and Adaptation to Western Nebraska

Carlos A. Urrea, Dry Bean Breeder, and Robert M. Harveson, Extension Plant Pathologist, University of Nebraska- PREC

Chickpea production has been decreased since 2007 from less than 300 acres to a very few acres in 2012 and 2013 in western Nebraska due to Ascochyta blight, caused by *Ascochyta rabiei*, a seed-borne disease. The pathogen attacks leaves, stem, and pods severely affecting seed quality. Although genetic resistance is the most cost effective strategy for control of blight there are other disease management strategies such as crop rotation, removal of volunteer plants, deep plowing, and fungicide treatment that can augment the use of resistant genes. Identifying varieties with Ascochyta blight resistance will bring great value to regional production by helping us become a competitive production area by reducing pesticide use and lowering production costs.

The main goal of this project funded by the Nebraska Department of Agriculture through the Specialty Crop Block Grant is to identify chickpea cultivars with Ascochyta and root rot resistance for western Nebraska.

An experiment was carried out to access yield losses due to Ascochyta blight. Twenty lines including 8 cultivars and 14 experimental lines selected from 2012 were evaluated at the PHREC-Mitchell, NE under irrigated conditions. Ascochyta blight was controlled with one fungicide treatment (LEM 17 EC) at flowering stage. The treatments were arranged in a split plot design, where the fungicide treatment (protected vs. non-protected) was the main plot, and the chickpea lines were assigned as sub-plots. Each treatment was replicated 3 times. PHREC-Ca-Comp. #1 and PI 17256 were used as tolerant checks. Additionally, thirteen experimental lines (PHREC-*Ca*-Comp. #1, PI 17256, CA0469C020C, CA0469C025C, NE21-11-12, NE21-11-5, NE21-11-16, NE21-11-17, NE21-11-18, NE21-11-21- NE21-11-22, and NE21-11-23) were planted in strips on May 7, 2013 at Grant, NE, in Chad Briggs' farm.

Ascochyta blight incidence was so low due to a hot summer. Since, not difference were detected among the chemical treatment, yields were combined. CDC Frontier was the highest yielder followed by CDC-Orion, NE21-11-15, and NE21-11-22 with yields of 2069, 1855, 1773 and 1724 lbs/acre, respectively. Myles, Sarah, Dylan, and HB-14 had the lowest yields of 593, 618, 664, and 771 lbs/acre, respectively. Sarah, Miles, and NE21-11-16 were desi types. Dylan has the largest seed, kabuli type.

The experiment at Grant, NE planted by Chad Briggs was destroyed by hail by the end of September. Seeds of the experimental lines are being sent to New Zealand for seed increase. The experiment will be repeated in 2014.

Chickpea trial grown at Mitchell, Ne during 2013.

PEDIGREE	Yield	No. seeds/pound
	lbs/acre	#

SIERRA	1026	1154
DYLAN	664	958
MYLES	593	2796
SARAH	618	3359
SAWYER	1117	1266
CA0090B347C	1398	1328
CA0469C020C	1505	1232
CA0469C025C	1082	1281
PI 17256	1265	1859
PHREC-Ca-Comp.#1	1520	1505
CDC ALMA	1389	1351
CDC ORION	1855	1309
CDC FRONTIER	2069	1431
NE21-11-12	973	1380
NE21-11-15	1773	1265
NE21-11-16	1074	2572
NE21-11-17	1517	1300
NE21-11-18	1523	1535
NE21-11-21	1605	1229
NE21-11-22	1724	1120
NE21-11-23	1372	1298
HB 14	771	1164
GRAND MEAN	1292	1531
LSD 5 %	841	296
CV %	32.6	9.7