CRP Dryland Systems

Technical report – 2014

Cluster of activity

Identify and introduce stress tolerant, high-yielding and improved quality varieties of cereals, potato, vegetable, horticultural, fodder crops through on-farm adaptive trials.

Reporting Center: ICARDA

Supporting CRP: CRP WHEAT

Action Site: Fergana Valley

Problem addressed:

Frost and terminal heat are two important abiotic constraints to successful winter wheat cultivation in Sugd Province of Tajikistan, a part of Fergana Valley of Central Asia. There are limited options of frost and heat tolerant winter wheat varieties to the farmers in the region.

Yellow rust is a perennial problem of irrigated winter wheat in the Fergana Valley of Uzbekistan. The wheat cultivars being cultivated by the farmers are susceptible to yellow rust. Yellow rust resistant winter wheat varieties have been released in Uzbekistan through international collaboration but wheat farmers in Fergana are not aware of these resistant varieties.

Outputs

1. Twelve winter wheat varieties previously selected for frost and heat tolerance in Uzbekistan were evaluated in Sugd in replicated yield trial.
2. Eighteen released and pipeline varieties with resistance to yellow rust were evaluated in the demonstration plots.

Outcomes:

1. Five frost and heat tolerant superior winter wheat varieties were identified for Sugd province in Tajikistan.
2. Thirty four wheat farmers became aware of and received information about the yellow rust resistant winter wheat varieties in Uzbekistan through a field day organized to observe and evaluate the demonstration plots of winter wheat varieties.
3. The participant farmers requested seed of three (Hazrati Bashir, Gozgon and Bunyodkor) yellow resistant new winter wheat varieties they had not grown before.

Partners:

- Tajik Farming Institute (Sugd Branch) – management of field experiments and seed production in Khujand, Tajikistan.
- Uzbek Research Institute of Plant Industry, Kibray – support in planting and supervision of demonstration plots in Fergana, Uzbekistan.
- Kashkadarya Research Institute of Grain Breeding and Seed Production, Karshi – providing germplasm for field trials.

Experiment 1: Evaluation of winter wheat genotypes for frost and terminal heat tolerance

Action site: Fergana Valley (Khujand, Tajikistan)

Number of genotypes: 15 (Table 1).

- Experimental lines -11
- Released cultivar from Uzbekistan – 1 (Yaksart)
- Local checks – 3 (Krasnodar-99, Alex and Ormon)

Experimental design: RCBD in three replications.

Plot size: 10 m^2

Results:

- Several experimental genotypes significantly outyielded the three local checks. (Table 1)
- Based on field performance in standing crop near maturity researchers selected five experimental genotypes (KR11-9014, KR11-28, KR11-20, KR12-08 and KR12-10). During a farmers' field day (Figure 1), the group of farmers selected KR11-28 and KR12-10 as the two most superior genotypes.

Figure 1. Farmers' evaluating the performance of winter wheat varieties in Khujand, Sugd, Tajikistan, 11 June, 2014.

Table 1. Performance of winter wheat genotypes under frost conditions in Khujand, Tajikistan, 2013-2014.

Geno	Name	Yield	Field selection	
			Researchers	Farmers group
1	Krasnodar-99 (Local Check)	4.927		
2	Alex (Local Check)	4.150		
3	Yaksart	5.533 abc¶		
4	Ormon (Local Check)	4.360		
5	KR11-03	4.680 ab		
6	KR11-9014	5.710 abc	√	
7	KR11-28	5.680 abc	√	√
8	KR11-20	5.570 abc	√	
9	KR11-9015	5.123 ab		
10	KR11-29	4.870 ab		
11	KR12-07	5.720 abc		
12	KR12-08	5.610 abc	√	
13	KR12-09	5.530 abc		
14	KR12-10	5.120 ab	√	√√
15	12 Ug 99 SI 11	5.040 ab		
	LSD0.05	0.227		
	CV (%)	2.6		

¶Means followed by the letters abc and ab represent significantly higher yield than three and two local checks, respectively.

Experiment 2: Demonstration plots of released and pipeline varieties of winter wheat in Fergana, Uzbekistan, 2013-2014.

Action Site: Fergana Valley (Fergana Province)

Number of farmers' field: 2

Number of varieties: 18 (Table 2)

Plot size: 50 m^2

Number of replication – 1

Evaluation of the demonstration plots: by a group of 34 farmers, researchers and policy makers on a Farmers' Field Day on 31 May 2014

Results:

- The participants of the Farmers' Field Day were given information about yield potential, disease resistance, quality, and maturity of the different varieties in the demonstration plots by the researchers (Figure 2).
- The participants asked questions about different aspects of the varieties and availability of seed for the next crop season.
- The participants evaluated each plot, first in group and then individually.

Farmers' preferred varieties:

1. Yaksart
2. Hazrati Bashir
3. Bunyodkor
4. Gozgon

Table 2. List of winter wheat varieties evaluated in two farmers' fields in Fergana province of Uzbekistan

Number	Name	Yellow rust resistance	Selected by researcher	Selected by farmers
1	Yaksart	MR¶	√√	√√
2	Krasnodar 99	S		
3	Elomon	MR	√	
4	Hisorak	R	√	
5	Tanya	S		
6	Jaykhun	MR	√√	
7	Gozgon	R		√
8	Yorkin	-		
9	Grom	-		
10	Turkiston	MR	√	
11	Bunyodkor	R		√√
12	Hazrati Bashir	MR		√
13	Grasiya	-		
14	Farovon	R	√√	
15	Barhyot	R	√√	
16	13CAC 7-39-66	R	√	
17	13Agroeco 13-44-90	R	√√	
18	13Agroeco 14-60-81	R	√	

¶ R = resistant. MR = moderately resistant, S = Susceptible.