CRP Dryland Systems

Activity Report: 2014

(CA) 4.4 IDENTIFY AND INTRODUCE STRESS TOLERANT, HIGH-YIELDING AND IMPROVED QUALITY VARIETIES OF CEREALS, POTATO, VEGETABLE, HORTICULTURAL, FODDER CROPS THROUGH ON-FARM ADAPTIVE TRIALS

Action Site:

Fergana Valley

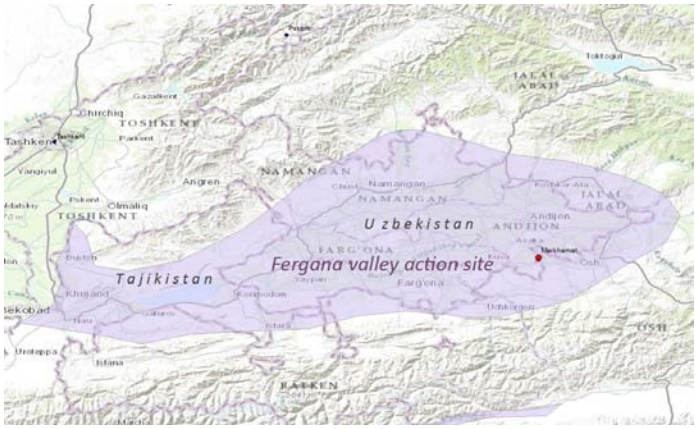
CG Center involved: CIP

Objective

To identify and introduce stress tolerant, high-yielding and improved quality varieties of potato CIP conducted observation trials in Nukus (action site: Aral Sea region) and Andijan (action site: Fergana valley), Tashkent, during the second growing seasons present in these regions (Mid-July till October). The main objective of trails was testing on productivity CIP breeds, potentially tolerance to heat, salinity and diseases.

Fergana Valley Action Site

Eleven potentially tolerance to heat high productive CIP clones have been selected for testing in Andijan (Table 1). Potato mainly is growing on the second growing season in this region. Due to the potato's new opportunity to have a part in inter-cropping system in Fergana valley, growing between wealth and cotton, to select and introduce a tolerance to heat high productive potato varieties is much important for Fergana valley region.



The trials were carried out in a field belonging to the farmer, located in the Markhamat district, Andijan region (Latitude: 40°30',Longitude: 72°17'). Planting was done on July 22, 2014, and harvest 4 November (104DAP).

Eighteen trail plots with land size 1.75m2 (0.7x2.5m)have been established through the following scheme: Planting distance: 0.70 x 0.25 cm, one row per plot, ten plants per row. As the basal fertilizers was used 1. Ammonium sulfate (10g/linear metter or 143 kg/ha, 30 N/ha); 2.

Monoammonium phosphate (20g/lm or 286 kg/ha, 31N:132P2O5); 3. Potassium chloride (17.5g/lm or 248 kg/ha, 149K2O5). Additional fertilizer Urea has been applied before the second ridging in the concentration 10g/lm (143kg/ha or 66N). Fertilization formula: 127N:132 P2O5:149K2O.

The following phytosanitary treatments have been used: Confidor and Gaucho (imidacloprid: 200g/l and 58.5% respectively) were alternatively sprayed for a total of three sprays at the rate of 0.16kg of commercial formulation per hectare to control Potato Colorado Beetle (Leptinotarsa decemlineata, Say).

During the vegetation period the trail plots irrigated twelve times through furrow irrigation. Haulm killing was practiced 30 October. Trials were separated by a corridor of 1m wide between plots.

The data regarding the temperature, humidity, rainfall, rain days received from Hydro-Meteo Station from Andijan. (Table 2). The highest temperature during the trial was recorded in July (37.5oC). The lowest temperature was recorded in October (0^{o}C).

Total rainfall of 31.6 mm was recorded, evenly split during vegetation period for a total of 11 rainy days.

The following biometric measurements have been observed: Plant emergence: marking the date when 80% of plants have emerged, Plant height (cm): at 50 and 70 DAP, No. of stems per plant: 60 DAP. According to collected and analyzed data clones 302499.30 and 397077.16 are distinguished with well developed canopy.

Harvested potato tubers evaluated by the tubers' size in three gradations: >55mm, 55-25mm, <25mm (Table 3). Deformed tubers were evaluated separately.

Results:

- Clones 302499.30 (40.64 t/ha) and 397077.16 (43.82 t/ha) had the highest yield according to plant and area harvested.
- All tested clones shown high marketability rate excluding to clones 302499.24 (35.64%) and 302428.20 (27.71%), which had significantly lower marketability rate.
- Clone 397077.16 and clone 302499.30 have highest mean tuber weight, accordingly: 144.16 g and 148.19 g.

Conclusion:

Clones 302499.30 and 397077.16 have highest performance yield and tuber marketability, mean tuber weight. These characteristics make them suitable for further use in local conditions.

Clone 397077.16 already is registered in the local list of varieties named "Sarnav". This clone is introduced in Tashkent region. As the result of the current trail this clone show high productivity in Fergana Valley region also.

Outputs:

- Two high productive CIP clones 302499.30 and 397077.16, tolerance to heat, have been defined under soil-climate condition of Markhamat district, Andijan region.
- CIP recommend these two clones for future multiplication and introduction in area with slight-moderate salinity of Fergana Valley.
- Proposed potato clones can be included in crop rotation system as inter-crop between wealth and cotton. Heat tolerance high productive potato CIP clones 302499.30 and 397077.16 give opportunity to improve options for inter-cropping systems integrating cereals, cotton and potato.

Table 1. CIP clones

Variety and Uzbek code	CIP No.
C-17/Sarnav	397077.16
C-10	392797.22
L-1	302428.20
L-2	302476.108
L-5	303381.106
L-3	302499.24
L-4	302499.30
L-8	304350.100
L-17	304387.39
L-18	304394.56
L-20	304406.31

Table 2. Meteorological data

Months	Decade	Temperature (0C)	Relative Humidity (%)	Rainfall (mm)	Rainy days
July	II	28.2	40.4	0	0
	III	27.0	47.6	0	0
	Max	37.5	-	0	0
	min	16.5	16.0		
	mean	27.5	44.2		
August	I	26.3	52.3	0	0
	II	24.8	56.7	4.5	2
	III	26.1	53.5	0	0
	Max	36.2	-	4.5	2
	min	13.0	25.0		
	mean	25.8	54.2		
September	I	23.1	53.2	0	0
	II	20.2	56.3	0	0
	III	20.0	61.2	0	0
	Max	34.0	-	0	0
	min	8.5	19.0		
	mean	21.1	56.9		
October	I	16.1	76.0	16.6	5
	II	13.2	69.5	0	0
	III	11.3	77.7	10.5	4
	Max	27.3	-	27.1	9
	min	0.0	29.0		
	mean	13.5	74.5		
Total Rainfall (mm)				31.6	11

Table 3 Yield performance of harvested CIP-breed clones, 2014

CIP code	Total yield (t/ha)	Marketability (%)		Unmarketability				Mean tuber weight (g)
				<25 mm		Deformed		
		t/ha	%	t/ha	%	t/ha	%	
397077.16	43.82	35.32	73.69	0.33	11.27	8.17	15.03	144.16
392797.22	28.93	22.68	53.82	1.14	32.64	5.10	13.52	56.04
302428.20	17.06	6.22	27.71	2.62	52.46	8.20	19.82	39.65
302476.108	31.88	19.69	58.36	0.66	18.97	11.52	22.65	100.97
303381.106	13.08	10.00	54.96	1.61	37.01	1.46	8.01	29.36
302499.24	28.95	16.89	35.64	1.44	29.67	10.60	34.68	54.69
302499.30	40.64	27.61	56.94	0.28	12.50	12.74	30.55	148.19
304350.100	36.32	32.40	70.90	0.30	23.90	3.61	5.18	84.93
304387.39	29.02	23.02	58.95	1.48	32.25	4.51	8.79	72.75
304394.56	25.21	16.49	56.26	0.55	17.55	8.17	26.17	92.27
304406.31	21.77	14.93	45.93	1.42	39.60	5.40	14.46	50.29
Mean	28.9	20.5	53.9	1.1	28.0	7.2	18.1	79.4
CV (%)	8.0	30.4	38.4	69.8	52.7	78.6	79.7	24.9
LSD (0.05)	3.92	10.59	35.28	1.28	25.10	9.67	24.54	33.70