



**CIMMYT-Afghanistan**

**Annual Report**

**2009**

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## Preface

This annual report summarizes the research and capacity building activities undertaken by CIMMYT-Afghanistan during 2008 – 2009 for wheat and maize. The results for various international and national field trials are present in the report. CIMMYT-Afghanistan is highly appreciative of the support by the Ministry of Agriculture, Irrigation and livestock (MAIL), Afghanistan, in carrying out various activities. I would like to thank the scientists and researchers at various research stations of Afghanistan Agricultural Research Institute (ARIA) who assisted in trial management and data collection in various experiments. I greatly appreciate collaboration of ARIA, Seed Section of FAO, and other partners in Afghanistan. I am thankful to AusAid/ACIAR, for their financial support for the activities undertaken by CIMMYT-Afghanistan.

Finally, I am especially thankful to CIMMYT Headquarters in Mexico, CIMMYT regional offices and partners for all their support.

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## EXECUTIVE SUMMARY:

### Major outputs:

- Three new wheat cultivars were released by the name “Koshan 09”, “Baghlan 09”; and “Muqawim 09”. These have been selected in Afghanistan from the CIMMYT’s (QUAIU#1), (PICAFLOR#1) and (2<sup>nd</sup> EBWYT #14) Wheat Yield Trials respectively, they are in the process of seed increase in 2010.
- Four promising lines have been identified for release for irrigated conditions.
- Four promising lines have been identified for release for rain fed conditions.
- 26 promising lines for irrigated and 13 promising lines for rain fed condition have been identified and will be further tested.
- Two new barley varieties are being proposed for release for cultivation.
- Two more promising barley lines have been identified and they will be candidate for pre release in the next season.
- Two promising durum wheat are in the pipeline for release.
- Two promising Triticale lines are in the pipeline for release.
- Basic seed of nine Ug99 resistant lines have been planted, each in 5115 m<sup>2</sup>, at various sites for evaluation and multiplication in “Fall 2009.”
- Out of 1172 wheat lines tested in 57 trial /nurseries 333 promising one have been selected/advanced for further evaluation in 2010.
- 1561 Kg Basic seed of two pre-release barley varieties has been produced in 2009 for nucleus seed production in 2010.
- The following genotypes of bread wheat were released in 2009:

Local Name	Cross	Origin
Muqawim 09	OASIS/SKAUZ//4*BCN/3/2*PASTOR	2 <sup>nd</sup> EBWYT# 14
Koshan 09	BABAX/LR42//BABAX*2/3/VIVITSI	3 <sup>rd</sup> EBWYT # 522
Baghlan 09	KIRITATI//SERI/RAYON	3 <sup>rd</sup> EBWYT # 520

- The following genotypes of bread wheat are under consideration for release in 2010 for irrigated condition:

Cross	Origin
CHONTE#1 SERI.1.B*2/3KAUZ*2/BOW//KAUZ/4/PBW343*2/ KUKUNA	3 <sup>rd</sup> EBWYT # 512
HPO/TAN//VEE/3/2*PGO/4/MILAN/5/SSERI1	2 <sup>nd</sup> EBWYT # 27
SUNSU/CHIBIA	28 <sup>th</sup> ESWYT #144
WBLL1*2/KUKUNA	27 <sup>th</sup> ESWYT # 148

- The following genotypes of bread wheat are under consideration for release in 2010 for rain fed conditions:

Cross	Origin
CROC-1/AE.SQUARROSA(205)//BORL 95/3/KENNEDY	15 <sup>th</sup> SAWYT # 342
URES/JUN//KAUZ	NUT Pak RF # 6
SHARP/3/PRL/SARA//TSI/VEE/#5/5/VEE/LIRA//BOW/3/BCN/4/KAUZ	16th SAWYT # 317
CROC_1/AE.SQUARROSA(224)//OPATA/3/PASTOR	16th SAWYT # 332

The following genotypes of bread wheat are promising cultivars in 2010 for irrigated conditions:

Cross	Origin
MILAN/OTUS//ATTILA/3*BCN	27 <sup>th</sup> ESWYT# 142
WBL1*2/4/YACO/PBW65/3/KAUZ*2/TRAP//KAUZ	28 <sup>th</sup> ESWYT # 147
VO3079(CIMMYT material)	NUT Pak NS # 5
CS/TH.SC//3*PVN/3/MIRLO/BUC/4/MILAN/5/TILHI	27 <sup>th</sup> ESWYT # 19
PBW65/2*PASTOR	1 <sup>st</sup> EBWYT # 26
PASTOR/3/KAUZ*2/OPATA//KAUZ	Elite-YT –Demo # 14
PASTOR/3/VORONA/CN079//KAUZ	37 <sup>th</sup> IBWSN # 124
PASTOR/3/VORONA/CN079//KAUZ	26 <sup>th</sup> ESWYT # 16
FRET2*2/4/SNI/TRAP#1/3/KAUZ*2TRAP//KAUZ	39 <sup>th</sup> IBWSN # 1151
KAUZ/PASTOR	NUT Pak NS # 9
KT/BAGE//FNU/3/CH-86	NUT (Pak) NS # 10
C80.1/3*BATAVIA//2*WBL1	1 <sup>st</sup> STEMRRSN # 6015
SERI*3//RL6010/4*YR/3/PASTOR/4/BAV92	1 <sup>st</sup> STEMRRSN # 6025
TUKURU/PASTOR	1 <sup>st</sup> STEMRRSN # 6029
BABAX /LR42//BABAX	1 <sup>st</sup> STEMRRSN # 6076
ESDA/LIRA/MILAN/3/VEE#5/SARA	1 <sup>st</sup> STEMRRSN # 6086
SEHER-2006 Cultivar in Pakistán	NUT (Pak) NS # 13
CNDO/R143 //ENTE/MEXI_2/3/AEGILOPS SQUIARROSA(TAUS) /4/ WEAVER/5/2*PASTOR/6/SKAUZ/PARUS//PARUS	4 <sup>th</sup> EBWYT # 512
WBL1*2/BRAMBLING	4 <sup>th</sup> EBWYT # 515

The following genotypes of bread wheat are promising varieties for rain fed condition in 2010:

Cross	Origin
W-3918/JUP	NUT (Pak) RF #5
KS940935.7.1.2/2* Pastor	15 <sup>th</sup> SAWYT#311
TIE CHUAN1* 2/3/HE1/3*CNO79//2*SERI	15 <sup>th</sup> SAWYT#338
QT6581/4/PASTOR//SITE/MO/3/CHEN/AEGILOPS SQUARROSA (TAUS)//BCN	15 <sup>th</sup> SAWYT#347
CHAM6/ATTILA//PASTOR	14 <sup>th</sup> SAWYT#14
CHIBIA/5/CNDO/R143//ENTE/MEXI_2/3/AEGIOPSSQUARROSA (TAUS) /4/WEAVER	14 <sup>th</sup> HRWYT#21
TAM200/TUI//MILAN/KAUZ/3/BABAX	14 <sup>th</sup> SAWYT#48
NWT/3/TAST/SPRW//TAW12399.75/6/SXL/VEE/4/TJB916.46/CB// *2MHB/3/BUC/5/ID13.1/MLT	9 <sup>th</sup> WON-SA # 485
PASTOR//TODY/BAU/3/PASTOR	14 <sup>th</sup> SAWYT#26
BABAX/PASTOR/3/KAUZ*2/YACO//KAUZ	14 <sup>th</sup> HRWYT #10
PBW65/2*PASTOR	NUT(Pak)LSD#11
CAL/NH//H567.71/3/SERI/4/CAL/NH//H567.71/5/2*KAUZ/6/WH576 /7/WH542	25 <sup>th</sup> ESWYT #8

The following genotypes of bread wheat are promising cultivars in 2010:

Cross	Origin
KIRITATI/4/2*SERI.1B*2/3/KAUZ*2/BOW//KAUZ	4 <sup>th</sup> EBWYT # 503
PBW343*2/KUKUNA/3/PASTOR//CHIL/PRL/4/PBW343*2/KUKUNA	4 <sup>th</sup> EBWYT # 507
WHEAR//INQALAB 91*2/TUKURU	4 <sup>th</sup> EBWYT # 508
PBW343*2/KUKUNA//PBW343*2/KUKUNA	4 <sup>th</sup> EBWYT # 511
KAUZ//ALTAR84/AOS/3/PASTOR/4/MILAN/CUPE//SW89.3064/5/KIRITATI	4 <sup>th</sup> EBWYT # 521
WHEAR/SOKOLL	4 <sup>th</sup> EBWYT # 529
WHEAR//2*PRL/2*PASTOR	4 <sup>th</sup> EBWYT # 530
SOKOLL/3/PASTOR//HXL7573/2*BAU	Cid 472868 GID 5435731
PASTOR//HXL7573/2*BAU/3/SOKOLL/WBLL1	Cid 473247 GID 5435731

The following barley genotypes are potential candidate cultivars for release considerations in 2010:

Cross	Origin
TOCTE/TOCTE//BERROS/3PETUNIA 1/4/CANTUA	28th IBYT#902
MJA/BRB2//QUINA/5/.....	14th EMBSN#9319

#### Durum Wheat

Cross	Origin
SVALE 1/DIPPER 5/4/ARAM 5/CALI//RASCON 37/3/PLATA 8	35 EDUTY#7919
SHAG 21/DIPPER 2//PATA 2/5/ARAM 7//CREX/ALLA/4/ ENTE/MEXI 2//HUI/3/YAV 1/GEDIZ	35 EDUTY # 7899

#### Triticale:

Cross	Origin
FAHAD 8-2*2//PTR/PND-T/3/GAUR 3/ANOAS 2//.....	36 <sup>th</sup> ITYT# 8
SUSI 2/5/TAPIR/YOGUI 1//2*MUS X/3/ERIZO- 7/4/FARAS 1/6/VARSA 2/7/754.3/IBEX//BUF 2	39th ITYT# 808

The following Maize variety is prerelease and candidate for release consideration in 2010.

Name	Origin
Rampur 9433	IABV0340)2003 EVT-SAFTL2002B6144

### A. Research:

A large number of field experiments were undertaken on wheat, durum, triticale and barley during 2008-2009 crop cycles. A number (57) of nurseries and yield trials obtained from ICARDA-CIMMYT Wheat Improvement Program (ICWIP), and Turkey-CIMMYT-ICARDA (TCI), and other sources were included in the field evaluation conducted at various sites in Afghanistan.

The 2008-2009 crop cycle could be characterized as near typical with normal yield levels. Yellow rust levels on wheat were low to high at various testing sites.

**Based on grain yield, disease score, maturity and other agronomic characters, many lines were selected and advanced to next cycle of testing. A list is given below.**

Nursery / yield trial	No. of Sets	Number of lines	
		Tested	Advanced
29 <sup>th</sup> Elite Spring Wheat Yield Trial (29 <sup>th</sup> ESWYT)	8	50	14
16 <sup>th</sup> Semi-Arid Wheat Yield Trial (16 <sup>th</sup> SAWYT)	2	40	14
4 <sup>th</sup> Elite Bread Wheat Yield Trial (4 <sup>th</sup> EBWYT)	3	30	11
41 <sup>st</sup> IBWSN	4	153	58
26 <sup>th</sup> SAWSN-W	2	117	19
16 <sup>th</sup> FAWWON-IRR	1	90	25
16 <sup>th</sup> FAWWON-SA	1	165	19
12 <sup>th</sup> IWWYT-IRR	2	20	8
11 <sup>th</sup> IWWYT-SA	2	20	5
3 <sup>rd</sup> STEMRRSN	1	110	49
2 <sup>nd</sup> STEMRRSN	1	137	34
NUT 2008-2009 40Var	9	40	6
NUWYT (Pak) RF	2	20	8
AYT-IRR	3	25	14
AYT-RF	2	20	6
AYT-STRRSN	1	15	6
AYT spring planted	3	15	9
PYT(40 IBWSN) DA	1	25	10
PYT (40IBWSN) NAN	1	50	9
NBYT	4	15	6
ABYT	4	15	3
<b>Total</b>	<b>57</b>	<b>1172</b>	<b>333</b>

**B. Training, workshop and seminar:**

Capacity building of national research and extension personnel continued to be a priority in 2008-2009 year as well. Many scientists benefited from the training organized in-country. CIMMYT's research activities and findings in Afghanistan were shared at a number of seminar and conferences. Several workshops were organized on topics relevant to wheat and maize research and extension in Afghanistan. Participants from different related organizations benefited from these workshops.



## **1. General:**

Wheat (*Triticum aestivum* L. em. Thell.) is the most important food crop in Afghanistan covering an estimated area of 2.575 million hectares. Average wheat yields in Afghanistan (1.97 ton/ha) is lower than other countries in the region resulting in import of wheat grain. Efforts are underway to streamline wheat research activities to develop new improved varieties and technologies to increase yields at the farm level. There are several constraints to successful wheat production in Afghanistan. These include biotic stresses such as diseases and abiotic stresses like high temperature, and semi-arid conditions. In this background, breeding for higher grain yield for different climatic and crop management conditions, resistance breeding particularly Ug99 resistance and improved agronomic management are the primary objectives of wheat program in Afghanistan. This is achieved currently by testing exotic wheat genotypes at multiple sites in different agro-climatic zones of Afghanistan and selecting the lines showing improved adaptation, stability of performance, acceptable agronomic traits and disease resistance, compared to local commercial cultivars for different target areas summarized in the following pages.

## Darulaman Research Station, Kabul Darulaman, Kabul



This station is located in the south of Kabul at a distance of 10 km from the city center. The farmland is well irrigated and spread over 10 ha. The soil is heavy clay, low in organic matter and well drained with a pH of 8.2. This station soil is suitable for growing a number field and horticultural crops.

Its geographic location is 34°28' N and 69°09' E situated at an elevation of 1840 meters above sea level. The lowest winter temperatures drop down to -18°C whereas the highest summer temperatures go around 38°C. Its mean annual precipitation during 2005 to 2007 was 257 mm.

## Posi-e-shan Agricultural Research Station Baghlan



This station is located adjacent to the main highway at a distance of five kilometers south of Baghlan industrial city. Its area is about 103 hectares. The whole area is under irrigation and there is a river adjacent to the farm.

This station was established in 1957. Its soil is good and is suitable for growing many crops, the pH is about 7.0. Most of the station fields have not been leveled.

This research station is located on the slopes of swampy land that has not been entirely drained. The lower fields are wet and the higher fields have springs and underground water draining from higher levels. These water sources are a problem when trials are located near them.

This station located in  $36^{\circ}, 09', 304''\text{N}$  and  $68^{\circ}, 64', 640''\text{E}$  has an elevation of 1841 meters with a minimum annual temperature of  $-2.4^{\circ}\text{C}$  and a maximum mean temperature of  $26.6^{\circ}\text{C}$ . Its mean annual precipitation is 413 mm and the first frost comes about November 17. The last frost is usually about March 12. This provides some 249 frost-free days for the frost-free growing season.

### Bamyan Agricultural Sub-Station (Mullah Ghulam)

The Bamyan Sub-Station of 7 hectares was established in 1960 for research on major crops of the Province. It is located  $34^{\circ} 43'N$  and  $67^{\circ} 49'E$ , at an elevation of 2550 meters.

Summer temperatures range about  $17.8^{\circ} C$  and winter months reach  $-7.1^{\circ} C$  with abundant snow. Annual rainfall averages about 200 mm. The first frost occurs in late September and the last frost is usually about May 15, permitting crop production in a season of some 135 frost-free days.

The soils of this station are sandy loams and clay loams and irrigation water is provided from canals leading from streams.

Wheat, Barley, potatoes and alfalfa are major crops in this area and the elevation of this station will stimulate wide-spread interest in the results from research trials. Research results will have validity relating to the farm production of the upland plateaus of central Afghanistan.

## Urdu Khan Agricultural Research Station Herat



Urdu Khan Regional Agricultural Research Station is located at 5.8 kilometers southeast of Herat to the side of paved road. This road is extended from the Park Hotel of Herat. The station is adjacent to Urdu Khan Village and it is bounded on the north by Urdu Khan right canal and on the east by Urdu Khan East canal. The total land area is 225 hectares of which approximately 15 hectares were brought under cultivation in 1968. The water for irrigation comes from Hari Rod River through new canal and Urdu Khan Canal and there is not much problem of water shortage except in spring due to the time of cleaning the canals.

This station is located in a latitude of  $39^{\circ} 11' N$  and a longitude of  $68^{\circ} 13' E$  with an elevation of 964 meters. The maximum mean annual temperature is  $28.9^{\circ}C$ , minimum mean temperature  $-0.6^{\circ} C$  and precipitation is 220 mm. The first frost occurs around November 4 and the last frost comes about March 28. There are 226 frost-free days. During the summer months, a heavy wind blows steadily from the north and it is characteristically dry and hot, thereby evaporating.

## Kunduz Agricultural Research Station



The Kunduz Agricultural Research Station of 55 hectares was established in 1966 and is located near the southern city limits of Kunduz and adjacent to the main highway leading to Kabul. It is irrigated by a canal system from the Khan Abad River.

The soils of this station and area are windblown silt of a very fine texture and the organic matter content is very low. Undisturbed un-irrigated soils in the belt weigh from 23.6 to 25.4 kg per cubic foot. Soil weights of the cultivated, irrigated areas run about 40.8 kg per cubic foot.

The high mean temperature is 31.5°C or 88.7°F with the low mean being 0.0°C or 32°F. The average date for first frost occurs in mid-November and the last frost is in mid-March, with the average of 258 frost-free days. The average of rainfall recorded from 1960 through 1970 is 348 mm. annually.

With its elevation of 455 meters above sea level, situated at an latitude of 36°, 71', 320" N and longitude of 68°, 85', 933" E, and location near the center of this large area of irrigated farm land, the Kunduz station is ideally suited to provide information to area farmers. Crop that are included in the research program are wheat, corn, rice, cotton, melons, fruits and vegetables.

## Kokaran Agricultural Research Station Kandahar

The Kokaran Agricultural Research Station is located at a distance of 10 kilometers southwest of Kandahar City, adjacent to the main highway leading to Herat. Of the 45 hectares in the station about 22 hectares are used for wheat research and wheat seed production each year. The remainder of the land is utilized for fruit production, ornamentals and horticultural nurseries.

This station has been administered under central government control since 1952. In its early years it was used only for fruit nurseries and orchards, but now it is established as a regional Agricultural Research Station, including agronomic research.

The station is at an elevation of 1005 m above sea level. The total annual rainfall is about 124 mm. The first frost occurs about November 20 and the last frost usually occurs about February 21. There are usually 271 frost-free days in the growing season. Soils of the station are mainly sandy loams with pH 7.9.

## Balkh Agricultural Research Station Mazar-i-Sharif



The Balkh Station was established in 1961 to provide information to meet needs of farmers of the region. Area of the station is approximately 75 hectares, all irrigated by water from the Ajda Nar River. Important crops in the area are wheat, cotton, fruit and vegetables.

The station is located at 36° 42' N and 67° 13' E at an elevation of 378 meters above sea level, at the west side of Mazar-i-Sharif City.

Maximum mean temperature is 33.1° C and the minimum mean temperature is 1.1° C. Approximately 200 mm of precipitation are received each year. The first frost occurs about November 16 and the last about March 7, with 253 frost-free days.

Soil is clay loam, of medium fertility, and is similar to that of private farms. The land is relatively leveled and moderately drained.



## Shishambagh Research Station Nangarhar



This station is located at the eastern edge of Jalalabad city at latitude of  $34^{\circ}42'526''$  N, longitude  $70^{\circ}47'395''$  E, and an elevation of 552 meters above sea level. The station was established in 1963 and the first trials were planted in that year. Area of the station is approximately 12 hectares, of which approximately 6 hectares are used for research. The entire farm can be irrigated. Crops usually grown are wheat, rice, corn, fruit and vegetables.

Climate is sub-tropical, and is characterized by hot, humid summers and mild winters. The maximum temperature is  $40.6^{\circ}\text{C}$  and the minimum is  $2.0^{\circ}\text{C}$ . Mean annual precipitation is 242.9 mm, of which about 5.2% falls between planting and harvesting. Surface soils are loam and sandy loam: sub soils are classified as loams.

An additional area, New Farm, belongs to the Agricultural Research Station. New Farm is located 7 kilometers to the east adjacent of the Jalalabad-Peshawar highway. The area is approximately 100 hectares, which is under irrigation. At times, research trials are conducted here. The climate is the same as that of Shishambagh.

## Taloqan Agricultural Research Sub-Station Takhar



The Talqan Agricultural Research Sub-Station was established in 1965. It is in northeastern Afghanistan at  $36^{\circ} 74.023'N$  latitude and  $69^{\circ}, 51, 202'E$  longitude. It is 804 meters above sea level.

The sub-station consists of 26 hectares of land located four kilometers west of Talqan city, adjacent to the main road leading to Kunduz. Prior to its use as a crop research area, the land was utilized for fruit culture and as a forest nursery. One-half of the area of the station is now used for agronomic research and investigations on wheat, cotton, oil seed crops, horticulture and wheat seed increase.

The soil is clay and sandy loam; stream water is readily available for irrigation of crops. The research area has not been leveled but it is river bottomland, easily irrigated.

This station has a temperate climate with 250 frost-free days. The first frost comes about December 1 and the last winter freeze comes about March 27. Minimum temperatures usually average about  $-2.3^{\circ}C$  and maximum temperatures reach  $27^{\circ}C$ .

## Key Results from Wheat Trials:

In general, the 2008-2009 wheat seasons were near normal for grain yields. The wheat trials managed under irrigated conditions produced high yields. Yellow rust, which is usually widely present in Afghanistan, showed low to high severity at different sites. A number of genotypes showed superior performance than the local checks in almost all trials. A set of promising genotypes were identified for further testing in national trials in Afghanistan.

### Genotypes identified for further testing:

Trial / Nursery	Entry number	Table	Page
29 <sup>th</sup> ESWYT	<b>Kabul:</b> 104, 105, 106, 107, 110, 111, 119, 122, 123, 124, 133, 135, 137, 138, 142, 143, 144, 148, 150 = 19		
	<b>Nangarhar:</b> :106, 119, 120, 123, 126, 130, 133, 135, 136, 141, 142, 146 = 12	4	29
	<b>Baghlan:</b> 104, 105, 117, 123, 125, 126, 128, 130, 133, 134, 135, 137, 138, 141, 142, 145, 148 = 17	10	41
	<b>Kunduz:</b> 103, 105, 107, 108, 109, 110, 111, 112, 114, 115, 121, 131, 132, 133, 134, 135, 139, 141 = 18	5	31
	<b>Takhar:</b> 103, 105, 107, 108, 109, 110, 111, 117, 121, 130, 141, 143, 145 = 13	6	33
	<b>Balkh:</b> 106, 108, 110, 115, 133, 140, 141, 145, 150 = 9	7	35
	<b>Herat:</b> 103, 104, 105, 106, 107, 112, 113, 114, 115, 117, 124, 125, 126, 127, 128, 130, 133, 135, 136, 138, 141, 142, 143, 145, 148 = 25	8	37
	<b>Helmand:</b> 115, 116, 117, 118, 120, 121, 122, 129, 131, 133, 134, 135, 138, 142, 143, 144, 146, 148, 149 = 19	9	39
16 <sup>th</sup> SAWYT	<b>Herat:</b> 302, 305, 306, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 322, 323, 324, 325, 326, 327, 331, 332, 333, 334, 335, 339, 340 = 29	11	43
4 <sup>th</sup> EBWYT	<b>Nangarhar:</b> 503, 507, 508, 512, 513, 515, 516, 617, 518, 519, 520, 522, 529, 530 = 14	13	49
41 <sup>st</sup> IBWSN	<b>Kabul:</b> 1002, 1004, 1006, 1008, 1009, 1011, 1012, 1015, 1016, 1018, 1021, 1024, 1028, 1035, 1037, 1050, 1051, 1053, 1057, 1064, 1065, 1069, 1070, 1072, 1073, 1074, 1081, 1085, 1090, 1096, 1102, 1104, 1106, 1116, 1117, 1122, 1123, 1124, 1125, 1127, 1129, 1131, 1133, 1135, 1141, 1143, 1144, 1145, 1149, 1150, 1153 = 51	16	57
	<b>Nangarhar:</b> 1003, 1004, 1005, 1006, 1008, 1009, 1010, 1011, 1013, 1015, 1018, 1019, 1024, 1025, 1028, 1029, 1030, 1033, 1034, 1037, 1043, 1046, 1048, 1060, 1064, 1065, 1066, 1067, 1072, 1073, 1074, 1077, 1079, 1096, 1098, 1119, 1121, 1134, 1138, 1140, 1143, 1144, 1153 = 42	15	55
	<b>Baghlan:</b> 1006, 1008, 1009, 1010, 1011, 1013, 1015, 1018, 1019, 1021, 1024, 1025, 1028, 1029, 1037, 1046, 1050, 1052, 1053, 1054, 1055, 1056, 1065, 1070, 1077, 1078, 1081, 1082, 1085, 1104, 1106, 1114, 1115, 1116, 1118, 1119, 1128, 1141, 1142, 1149, 1150, 1152 = 42	17	59
26 <sup>th</sup> SAWSN-W	<b>Balkh:</b> 1004, 1009, 1014 = 3		74
	<b>Takhar:</b> 3007, 3013, 3015, 3016, 3017, 3019, 3024, 3025, 3026, 3029, 3033, 3034, 3036, 3037, 3057, 3070, 3071, 3075, 3077 = 19		74
16 <sup>th</sup> FAWWON-IRR	<b>Herat:</b> 3030, 3031, 3040, 3052, 3057, 3066, 3067, 3068, 3069, 3072, 3085, 3092, 3101, 3102, 3106, 3113, 3114 = 17		
16 <sup>th</sup> FAWWON-SA	<b>Bamyan:</b> 7, 8, 12, 13, 18, 19, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 40, 41, 42, 47, 48, 49, 51, 52, 53, 54, 55, 56, 57, 58, 61, 62, 63, 64, 65, 66, 67, 68, 69, 71, 72, 73, 74, 75, 77, 79, 80, 81, 84, 85, 86, 88, 89, 90 = 57		74
12 <sup>th</sup> IWWYT-IRR	<b>Takhar:</b> 106, 108, 109, 110, 113, 115, 116, 117, 120, 122, 124, 125, 126, 127, 131, 151, 152, 154, 157, 162 = 20		74
11 <sup>th</sup> IWWYT-SA	<b>Kabul:(FAA)</b> 2,8, 12, 13, 15,17, 18 = 7	19	66
	<b>Bamyan:</b> 3,8, 9, 10, 11, 12, 13 = 6	20	67
Special Trials	<b>Takhar:</b> only entry # 9	22	71
	<b>Herat:</b> 1,2,3,6,8,9,10,11,12, 13, 14, 15, 16, 17, 18, 20 = 16	23	72

3 <sup>rd</sup> STEMRRSN	Kabul: 6002, 6003, 6007, 6008, 6010, 6017, 6024, 6025, 6026, 6028, 6029, 6030, 6031, 6035, 6037, 6038, 6039, 6041, 6042, 6046, 6047, 6048, 6050, 6051, 6053, 6054, 6055, 6056, 6058, 6059, 6063, 6067, 6068, 6069, 6070, 6072, 6073, 6074, 6075, 6076, 6077, 6078, 6079, 6083, 6084, 6085, 6093, 6094, 6097, 6102, 6103, 6107, 6108, 6109, 6110 = 55		75
2 <sup>nd</sup> STEMRRSN	Kabul: 6002, 6004, 6005, 6012, 6013, 6014, 6016, 6020, 6024, 6025, 6028, 6029, 6030, 6035, 6050, 6062, 6063, 6064, 6065, 6072, 6073, 6075, 6076, 6086, 6087, 6121, 6122, 6123, 6124, 6126, 6127, 6128, 6129, 6130, 6135, 6136, 6137 = 37		75
<b>National Trials Prepared from CIMMYT Materials</b>			
NUT 08-09, 40Var	Kabul: # 5,19,20,29,30,33 =6 Nangarhar: # 2,5,6,8,11,12,13,14,16,17,19,20,21,22,23,31,32,33,34,36,38,39 =22 Baghlan: # 3,9,10,11,12,14,16,20,21,23,25,29,30,32,38 =15 Kunduz: # 3,15,16,17,19,20,22,25,27,29,32,33,34,37 =14 Takhar: # 3,6,8,17,20,23,31,32,38 =9 Balkh: # 7,14,15,22,23,30,38 =7 Herat: 1,2,3,5,6,7,8,9,10,12,13,14,16,17,18,20,21,22,23,25,29,30,31,32,33,34,35,36,37,38,39 =31 Kandahar: # 6,7,18,21,29,36 =6 Helmand: # 8,9,12,21,26,28 =6	26 32 27 28 29 30 31 33	80 92 82 84 86 88 90 94
NUWYT (Pak)RF	Takhar: # 1,4,5,8,9,10,11,12,18,19 =10 Herat: # 2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,19,20 =18	35 36	99 100
AYT-IRR	Kabul: # 1,3,7,9,12,18,23,24 =8 Nangarhar: Kunduz: # 2,4,5,12,14,17,18 =7	38 40 39	102 105 104
AYT-RF	Takhar: # 1,3,5,7,10,12,13,15,19 =9 Herat: # 1,2,4,6,7,8,9,10,11,12,13,14,16,17,18,20 =16	42 43	108 109
AYT-STRRSN	Kabul: # 5,8,10,11,12,14,15 =7	45	111
AYT-spring planted	Kabul: # 2,3,5,8,9,12,14 =7 Takhar: # 2,4,6,7,11,13 =6		112 113
PYT- (40 <sup>th</sup> IBWSN)	Kabul: # 1018,1054,1075,1081,1118,1132,1176,1181,1184 =9	48	114
PYT- (40 <sup>th</sup> IBWSN)	Nangarhar: # 1008,1009,1011,1016,1019,1134,1051,1052,1056,1057 1059,1072,1073,1081,1082,1083,1086,1103,1105,1114, 1134,1138,1148 =23	49	115
<b>Barley</b>			
NBYT	Kabul: # 1,6,7,8,14 =5 Kunduz:P Takhar: # 5,6,7,9,10,11,13,14 =8 Baghlan: # 1,2,4,5,7,8,9,10 =8	51 53 52	121 123 122
ABYT	Kabul: # 1,2,4,7,8,9 =6 Takhar: # 1,2,3,5,6,7,8,9,10,14 =10 Baghlan: # 1,2,3,5,6,9,10,11,14 =9	55 56	125 126



Figure 1. Map of Afghanistan showing different sites where wheat trials were conducted in 2008-2009 wheat growing season. The point on the map show approximate location of the experimental sites.

**Table 1. Site description and climatic data of experimental sites in Afghanistan where the wheat experiments were conducted**

No	Site	Institution	Latitude(N)	Longitude(E)	Altitude (m)	Mean Temperature (C°)		Annual rainfall(mm)	Frost free days
						Maximum	Minimum		
1	Badakhshan	Baharak	36° 50' N	70° 49' E	1733				
2	Baghlan	Posi-e-shan	36° 42' N	67° 13' E	510	26.6	-2.4	413	249
3	Balkh	Dehdadi	36° 65' N	66° 96' E	387	33.1	1.1	200	253
4	Bamyan	Mullah Ghulam	34° 43' N	37° 49' E	2550	17.8	-7.1	200	135
5	Herat	Urdu Khan	34° 18' N	62° 16' E	927	28.9	-0.6	367	226
6	Helmand	Bolan	34° 31' N	70° 14' E	789	32	7.4	200	262
7	Kabul	Darulaman	34° 28' N	69° 09' E	1841	26.5	0	550	238
8	Kandahar	Kokaran	31° 35' N	65° 40' E	630			124	271
9	Kunduz	Central Farm	36° 43' N	68° 51' E	373	31.5	0	348	258
10	Nangarhar	Shishambagh	34° 49' N	70° 74' E	541	40.6	2	243	274
11	Takhar	Taloqan	36° 44' N	49° 30' E	804	27	-2.3		250

**Table 2. Name of the trial, Research Station and the collaborators involved in wheat research in 2009 wheat growing season**

Trial name	Collaborating institution	Collaborator
29 <sup>th</sup> Elite Spring Wheat Yield Trial (29ESWYT)	Darulaman Research Station, Kabul	Ahmad shah Stankzai , Zmarai and Ahmad zia
	Dehdadi Research Station, Mazar	Ab. Wahid(FAO) Ahmad shah (ARIA)
	Bagh-e-Zakhira Takhar	Ab,Ghafar , S-Aminullah
	Shesham Bagh Research Station, Nangarhar	Shekeb Ahmad and Aminullah
	Urdu Khan Research Station, Heart	Noor Ahmad (ARIA) G. Ahmad (FAO)
	Central Farm Station, Kunduz	Ab.Moahmmad
	Posi-Eshan Research Station, Baghlan	M,Azam Niazai
	Bolan Research Station , Helmand	Ghulam Mohamad (FAO) and Ab,Mukhtar (Aria)
16 <sup>th</sup> Semi-Arid Wheat Yield Trial (16SAWYT)	Urdu Khan research station	Noor Ahmad and Muhammad Munir
	Baghe Zakhira Takhar (Not planted)	Abdul Ghafar
4 <sup>th</sup> Elite Bread Wheat Yield Trial (4 <sup>th</sup> EBWYT)	Shesham Bagh Research Station, Nangarhar	Shekeb Ahmad and Aminullah
	Darulaman Research Station, Kabul	Ab Wakil and Mohamad Hashem
	Posi-Eshan Research Station, Baghlan	M.Azam Niazai
41 <sup>st</sup> International Bread Wheat Screening Nursery (41 <sup>st</sup> IBWSN)	Faculty of Agriculture Research Station, Kabul	Ahmad Zia Yadgari (CIMMYT)
	Posi-Eshan Research Station, Baghlan	M.Azam Niazai
	Dehdadi Research Station, Mazar	Ab,Wahed (FAO) and Ahmad Shah
	Shesham Bagh Research Station, Nangarhar	Shekeb Ahmad and Aminullah
	Urdu Khan Research Station, Heart	Noor Ahmad and Muhammad Munir
26 <sup>th</sup> Semi-Arid Wheat Screening Nursery (26 <sup>th</sup> SAWSN-W)	Farm Zakhira, Takhar	Abdul Ghafar and Aminullah
Facultative Winter Wheat Observation Nursery- Irrigated (16 <sup>th</sup> FAWWON-IRR)	Mullah Ghulam research station ,Bamyan	Said Alli Hashemyan
Facultative Winter Wheat Observation Nursery-Semi Arid (16 <sup>th</sup> FAWWON-SA)	Farm Zakhira, Takhar	Ab,Ghafar and S-Amnullah
12 <sup>th</sup> International Winter Wheat Yield Trials (12 <sup>th</sup> IWWYT-IRR)	Faculty of Agriculture Research Station, Kabul	Ahmad Zia Yadgari (CIMMYT)
	Mullah Ghulam research station ,Bamyan	Said Alli Hashemyan
11 <sup>th</sup> international winter wheat yield trial SA(11 <sup>th</sup> IWWYT)	Urdu Khan Research Station, Heart	Noor Ahmad and Muhammad Munir
	Farm Zakhira, Takhar	Abdul Ghafar
3 <sup>rd</sup> Stem Rust Resistance Screening Nursery (3 <sup>rd</sup> STEMRRSN)	Darulaman Research Station, Kabul	Ghayasudin and M.Ali
2 <sup>nd</sup> Stem Rust Resistance Screening Nursery (2 <sup>nd</sup> SEEMRRSN)	Darulaman Research Station, Kabul	Ghayasudin and M.Mashooq

<b>NUT (40var) National Uniform Wheat Yield Trial</b>	Darulaman research station, Kabul	Ahmad Jan and M.Hashem Azmatyar
	Shesham Bagh research station ,Nangarhar	Shakib Ahmad and Aminullah
	Dehdadi research station ,Mazar	Ahmad Shah and Abdul wahid (FAO)
	Central Farm research station ,Kunduz	Abdul Muhammad
	Poseishan research Station, Baghlan	Muhammad Azam Niaza
	Urdo Khan research station ,Herat	Noor Ahmad and Muhammad Munir
	Farm Zakhira research station Takhar	Abdul Ghafar
	Kokaran research station Kandahar	Muhammad Nabi
	Bullan Research Station ,Helmand	Muhammad Mukhtar
<b>NUT (Pak)RF National Uniform Wheat Yield Trial - Rain fed</b>	Urdo Khan research station ,Herat	Noor Ahmad and Muhammad Munir
	Farm Zakhira, Takhar	Abdul Ghafar
<b>AYT- Advance Wheat Yield Trial-IRR</b>	Darulaman research station ,Kabul	Ahmad Jan and M.Hashem Azmatyar
	Farm Zakhira research station Takhar	Abdul Ghafar
	Shesham Bagh research station ,Nangarhar	Shakib Ahmad and Aminullah
<b>AYT-RF Advance Wheat Yield Trial-Rain fed</b>	Farm Zakhira research station Takhar	Abdul Ghafar
	Urdo Khan research station ,Herat	Noor Ahmad and Muhammad Munir
<b>AYT-STRRSN</b>	Darulaman research station ,Kabul	Abdul Ghaias and Muhammad Mashooq
<b>AYT-Spring Planted</b>	Darulaman research station. Kabul	Ahmad Shah stanikzai
	Central Farm research station ,Kunduz	Abdul Muhammad
	Farm Zakhira research station Takhar	Abdul Ghafar
<b>AYT-Badakhshan</b>	Baharak -Badakhshan	Nezamuddin
<b>PYT- (40<sup>th</sup>IBWSN)</b>	Darulaman research station ,Kabul	Ab Rahim and M.Hashem Azmatyar
<b>PYT- (40<sup>th</sup>IBWSN)</b>	Shishambagh research Station, Nangarhar	Shakib Ahmad and Aminullah
<b>PYT - (25<sup>th</sup> SAWSN)</b>	Darulaman research station ,Kabul	.....
<b>Barley</b>		
<b>NBYT National Barley Yield Trial</b>	Darulaman Research Station	Ahmad Shah stanikzai
	Poseishan research Station, Baghlan	M.Azam Niaza
	Central Farm research station ,Kunduz	Abdul Muhammad
	Farm Zakhira research station Takhar	Abdul Ghafar
<b>ABYT Advance Barley Yield Trial</b>	Darulaman Research Station	Ahmad Shah Stanikzai
	Poseishan research Station, Baghlan	M.Azam Niaza
	Central Farm research station ,Kunduz	Abdul Muhammad
	Farm Zakhira research station Takhar	Abdul Ghafar
<b>Seed Multiplication of Ug99 Resistant Lines /Varieties</b>		
<b>CHONTE #1</b>	Shishambagh research Station, Nangarhar	Shakib Ahmad and Aminullah
<b>PICAFLO #1</b>	Poseishan research Station, Baghlan	Muhammad Azam Niaza
<b>MUNAL #1</b>	Farm Zakhira research station Takhar	Abdul ghafar



QUAIU #1	Central Farm research station ,Kunduz	Abdul Muhammad
2nd EBWYT #10	Faculty of Agriculture Research Station, Kabul	Ahmad Zia Yadgari (CIMMYT)
	Poseishan research Station, Baghlan	Muhammad Azam Niazi
	Central Farm research station ,Kunduz	Abdul Muhammad
	Farm Zakhira research station Takhar	Abdul Ghafar
	Dehdadi research station ,Mazar	Ahmad Shah
	Urdo Khan research station ,Herat	Noor Ahmad and Muhammad Munir
	Mullah Ghulam research station ,Bamyan	Abdul wahid and Sayed Ali
	Bullan Research Station ,Helmand	Muhammad Mukhtar
2nd EBWYT #14	Faculty of Agriculture Research Station, Kabul	Ahmad Zia Yadgari (CIMMYT)
	Poseishan research Station, Baghlan	Muhammad Azam Niazi
	Central Farm research station ,Kunduz	Abdul Muhammad
	Farm Zakhira research station Takhar	Abdul Ghafar
	Dehdadi research station ,Mazar	Ahmad Shah (ARIA) and Abdul wahid (FAO)
	Urdo Khan research station ,Herat	Noor Ahmad and Muhammad Munir
	Mullah Ghulam research station ,Bamyan	Abdul wahid and Sayed Ali
	Bullan Research Station ,Helmand	Abdul Mukhtar (ARIA) , ghulam Muhammad (FAO)
2nd EBWYT #17	Faculty of Agriculture Research Station, Kabul	Ahmad Zia Yadgari (CIMMYT)
	Poseishan research Station, Baghlan	Muhammad Azam Niazi
	Central Farm research station ,Kunduz	Abdul Muhammad
	Farm Zakhira research station Takhar	Abdul Ghafar
	Dehdadi research station ,Mazar	Ahmad Shah (ARIA), Ab.Wahid (FAO)
	Urdo Khan research station ,Herat	Noor Ahmad and Muhammad Munir
	Mullah Ghulam research station ,Bamyan	Abdul Wahid and Sayed Ali
	Bullan Research Station ,Helmand	Abdul Mukhtar (ARIA), Ghulam M.(FAO)
2nd EBWYT #19	Darulaman Research Station , Kabul	Ahmad Jan and M.Hashem Azmatyar
	Faculty of Agriculture Research Station, Kabul	Ahmad Zia Yadgari (CIMMYT)
	Urdo Khan research station ,Herat	Noor Ahmad and Muhammad Munir
	Shishambagh research station, Nangarhar	Shakib Ahmad and Aminullah
	Mullah Ghulam research station ,Bamyan	Abdul Wahid and Sayed Ali
	Bullan Research Station ,Helmand	Abdul Mukhtar (ARIA), Ghulam Muhammad (FAO)
2nd EBWYT #27	Faculty of Agriculture Research Station, Kabul	Ahmad Zia Yadgari (CIMMYT)
	Poseishan research Station, Baghlan	Muhammad Azam Niazi
	Central Farm research station ,Kunduz	Abdul Muhammad
	Farm Zakhira research station Takhar	Abdul Ghafar
	Dehdadi research station ,Mazar	Ahmad Shah (ARIA), Abdul wahid (FAO)
	Urdo Khan research station ,Herat	Noor Ahmad and Muhammad Munir
	Mullah Ghulam research station ,Bamyan	Abdul Wahid and Sayed Ali
	Bullan Research Station ,Helmand	Abdul Mukhtar (ARIA), Ghulam Muhammad (FAO)

## **2. International yield trials / observation nurseries**

### **29<sup>th</sup> ESWYT**

#### **Performance of elite spring wheat genotypes in Afghanistan**

##### **Materials and methods**

This study was conducted using a set of 50 wheat genotypes included in CIMMYT's 29<sup>th</sup> Elite Spring Wheat Yield Trial (29<sup>th</sup> ESWYT) and a local commercial cultivar, which changed at different sites based on farmers' preference. These wheat genotypes represent diverse genetic backgrounds and a large number of them resulted from crosses involving parents with high yield, wide adaptation and resistance to biotic and abiotic stresses (Table 3). The wheat genotypes were tested at eight sites representing diverse wheat growing environments across Afghanistan.

The study was conducted during the wheat-growing season (Nov. to June) in 2008-2009 using a randomized complete block design with genotypes arranged in alpha lattice combination in two replications. Individual experimental plots of 6.0 m<sup>2</sup> were seeded as six 5.0-m long rows with 0.20-m row spacing. Fertilizers were mixed into the soil prior to seeding using different doses at different locations. The experimental plots were hand weeded as necessary at individual sites. The other trial management practices were consistent with good crop husbandry recommended for each site.

Days to heading was recorded when spikes of approximately 50% of the plants in a plot were fully emerged. At maturity, plant height in each plot was measured from ground level to the tip of the spikes. Days to maturity were recorded when glumes completely lost their green color. Agronomic score of the genotypes at maturity was recorded using a scale of 1 to 5 with 5 representing the best combination of agronomic traits based on the criteria circulated in CIMMYT's wheat trial field books. Plants were hand-harvested at the ground level from the middle 3.2 m<sup>2</sup> in each plot. After threshing, grain weight was recorded. Disease scorings were recorded whenever present in the plots.

Analysis of variance was conducted for each site.

## Results and discussion

The 2008-2009 wheat growing season was normal for most part of the crop cycle. Stripe and leaf rust incidence occurred in certain places. The wheat yield levels were high at all sites (Tables 4 -11).

The 50 genotypes in experimental trial of 29<sup>th</sup> ESWYT indicated significant differences for grain yield in Kunduz, Takhar, Balkh, Nangarhar, Herat and Helmand provinces while in Kabul and Baghlan there were no significant differences among the genotypes. Across site yield for grain ranged from 5240 to 6989 Kg/ha with an overall mean of 6187 Kg/ha indicated most of these genotypes well adapted in most part of Afghanistan.

Analysis of variance for grain yield at each location revealed that some genotypes were desirable in specific environment while few of them gave higher yield all over the country meaning that few of the exotic genotypes have wider adaptability across Afghanistan. Based on grain yield and resistance to rust diseases the following varieties have been advanced in each location

Helmand: entry # 110, 115, 133, 138, 142 and 144

Kabul: 106, 107, 115, 123, 124, 138, 141, 142, 143, 144, 145, 148, 150

Nangarhar: 106, 108, 110, 112, 119, 120, 122, 126, 127, 133, 140 and 148

Herat: 104, 110, 115, 133, 141, 142, 145, 148

Balkh: 110, 115, 133, 137, 141, 145, 148

Takhar: 104, 115, 124

Kunduz: 104, 111, 115, 133, 137, 141, 143, 144, 145, 148

Baghlan: 105, 106, 110, 111, 114, 115, 119, 123, 124, 133, 135, 137, 138, 141, 145, 148, 150

The wheat genotypes also varied for days to heading and maturity, plant height and agronomic score (Table 5). The number of days to heading at individual sites did not show a great deal of variation suggesting that genotypes did not behave differentially for this trait. Mean agronomic score of the genotypes ranged from low to high; however, a few genotypes had received a score of 5 at certain locations (Table 5). Considering that

these genotypes were developed in Mexico, it is expected that not all genotypes would perform better here.

**Conclusion:**

Mean yield across sites showed that 38 genotypes from these experimental trials produced more yield than local improved varieties used as check in this study. Some of the entries viz., # 104, 106, 110, 115, 133, 141, 142 and 148 performed better at more than one location indicating wider adaptability.

**Table 3: Name and origin name of 29th ESWYT 2008/2009 at Afghanistan**

Cross Name	Selection History	Origin
LOCAL CHECK		
PBW343	CM85836-4Y-0M-0Y-8M-0Y-0IND	MXI06-07\Mult29ESWYT1
ROELFS F2007	CGSS00B00169T-099TOPY-099M-099Y-099M-9CEL-0B	MXI06-07\Mult411BWSN6
PRL2*PASTOR	CGSS97Y00034M-099TOPB-027Y-099M-099Y-099M-27Y-0B	MXI06-07\Mult29ESWYT3
MILAN/S87230//BAV92	CMSS97M03689T-040Y-030M-020Y-030M-015Y-28M-1Y-2M-0Y	MXI06-07\Mult29ESWYT15
SITE/MO//PASTOR/3/TILHI	CMSS97M03910T-040Y-020Y-030M-020Y-040M-44Y-2M-0Y	MXI06-07\Mult29ESWYT14
NAC/TH.AC//3*PVN/3/MIRLO/BU/4/2*PASTOR	CMSS98Y01814M-040M-0100M-040Y-040M-030Y-17M-3Y-0M	MXI06-07\Mult29ESWYT17
MILAN/ARA90//TNMU/TUI	CMSS99Y03239T-040M-040Y-040M-030Y-030M-14Y-1M-1M-0Y	MXI06-07\Mult29ESWYT11
INQALAB 91*2/TUKURU	CGSS99B00015F-099Y-099M-099Y-099M-96Y-0B	MXI06-07\Mult29ESWYT9
OASIS/KAUZ//4*BCN/3/2*PASTOR	CMSS00Y01881T-050M-030Y-030M-030WGY-33M-0Y	MXI06-07\Mult29ESWYT12
FRET2/TUKURU//FRET2	CGSS00B00158T-099TOPY-099M-099Y-099M-32CEL-0B	MXI06-07\Mult29ESWYT19
WBLL1*2/KKTS	CGSS01Y00050T-099M-099Y-099M-099M-14Y-0B-0WGY	MXI06-07\Mult29ESWYT85
WAXWING/4/SNI/TRAP#1/3/KAUZ*2/TRAP//KAUZ	CGSS01Y00134S-099Y-099M-099M-13Y-0B	MXI06-07\Mult29ESWYT8
OTUS/KKTS//KKTS	CMSS01Y03110T-030M-030WGY-030M-4Y-0M-0Y	MXI06-07\Mult29ESWYT84
BABAX/LR42//BABAX*2/4/SNI/TRAP#1/3/KAUZ*2/TRAP//KAUZ	CGSS01B00045T-099Y-099M-099M-099Y-099M-40Y-0B	MXI06-07\Mult29ESWYT46
BABAX/LR42//BABAX*2/3/KUKUNA	CGSS01B00048T-099Y-099M-099M-099Y-099M-30Y-0B	MXI06-07\Mult29ESWYT47
WAXWING*2/BRAMBLING	CGSS01B00053T-099Y-099M-099M-099Y-099M-49Y-0B	MXI06-07\Mult29ESWYT49
PAURAUQUE	CGSS01B00055T-099Y-099M-099M-099Y-099M-26Y-0B	MXI06-07\Mult29ESWYT51
FRANCOLIN #1	CGSS01B00056T-099Y-099M-099M-099Y-099M-14Y-0B	MXI06-07\Mult29ESWYT27
FRANCOLIN	CGSS01B00056T-099Y-099M-099M-099Y-099M-33Y-0B	MXI06-07\Mult29ESWYT52
GRACKLE #1	CGSS01B00057T-099Y-099M-099M-099Y-099M-13Y-0B	MXI06-07\Mult29ESWYT53
GRACKLE	CGSS01B00057T-099Y-099M-099M-099Y-099M-17Y-0B	MXI06-07\Mult29ESWYT54
WAXWING*2/TUKURU	CGSS01B00058T-099Y-099M-099M-099Y-099M-57Y-0B	MXI06-07\Mult29ESWYT29
WAXWING*2/TUKURU	CGSS01B00058T-099Y-099M-099M-099Y-099M-62Y-0B	MXI06-07\Mult29ESWYT30
WBLL1*2/BRAMBLING	CGSS01B00062T-099Y-099M-099M-099Y-099M-22Y-0B	MXI06-07\Mult29ESWYT57
WBLL1*2/BRAMBLING	CGSS01B00062T-099Y-099M-099M-099Y-099M-47Y-0B	MXI06-07\Mult29ESWYT61
WBLL1*2/BRAMBLING	CGSS01B00062T-099Y-099M-099M-099Y-099M-73Y-0B	MXI06-07\Mult29ESWYT31
WBLL1*2/BRAMBLING	CGSS01B00062T-099Y-099M-099M-099Y-099M-87Y-0B	MXI06-07\Mult29ESWYT63
BECARD #1	CGSS01B00063T-099Y-099M-099M-099Y-099M-5Y-0B	MXI06-07\Mult29ESWYT64
TACUPETO F2001*2/BRAMBLING	CGSS01B00069T-099Y-099M-099M-099Y-099M-47Y-0B	MXI06-07\Mult29ESWYT69
MUU #1	CGSS01B00076T-099Y-099M-099B-40Y-0B	MXI06-07\Mult29ESWYT6
MUU	CGSS01B00076T-099Y-099M-099B-61Y-0B	MXI06-07\Mult29ESWYT7
ELVIRA/S/CNDO/R143//ENTE/MEXI75/3/AE.SQ/4/2*OCI	CMSS01M00172S-030M-1Y-0M-0Y	MXI06-07\Mult29ESWYT80
THELIN/3/BABAX/LR42//BABAX/4/BABAX/LR42//BABAX	CGSS02Y00083T-099B-099B-099Y-099M-16Y-0B	MXI06-07\Mult29ESWYT44
THELIN#2//ATTILA*2/PASTOR/3/PRL2*PASTOR	CGSS02Y00096T-099B-099M-099Y-099M-42Y-0B	MXI06-07\Mult29ESWYT42
KIRITATI//PBW63/2*SERI.B	CGSS02Y00139S-099M-099Y-099M-11Y-0B	MXI06-07\Mult29ESWYT33
KIRITATI//PRL2*PASTOR	CGSS02Y00141S-099M-099Y-099M-2Y-0B	MXI06-07\Mult29ESWYT22
KIRITATI//PRL2*PASTOR	CGSS02Y00141S-099M-099Y-099M-20Y-0B	MXI06-07\Mult29ESWYT36
KIRITATI//HUW234+LR34/PRINIA	CGSS02Y00144S-099M-099Y-099M-39Y-0B	MXI06-07\Mult29ESWYT25
KIRITATI//WBLL1	CGSS02Y00151S-099M-099Y-099M-10Y-0B	MXI06-07\Mult29ESWYT38
PFAU/SERLIB//AMAD/3/WAXWING	CGSS02Y00153S-099M-099Y-099M-46Y-0B	MXI06-07\Mult29ESWYT26
PFAU/MILAN//FISCAL	CMSS02M00051S-030M-9Y-0M-0Y	MXI06-07\Mult29ESWYT71
SKAUZ*2/FCT//FISCAL	CMSS02M00098S-030M-10Y-0M-0Y	MXI06-07\Mult29ESWYT72
VEE/PJN//KAUZ/3/PASTOR/4/FISCAL	CMSS02M00145S-030M-16Y-0M-0Y	MXI06-07\Mult29ESWYT73
PRL2*PASTOR/3/MILAN/KAUZ//CHIL/CHUM18	CMSS02M00164S-030M-12Y-0M-0Y	MXI06-07\Mult29ESWYT74
SW89.5193/KAUZ/3/CHIBIA//PRLI/CM65531	CMSS02M00194S-030M-4Y-0M-0Y	MXI06-07\Mult29ESWYT75
MUNIA/CHTO/3/PFAU/BOW//VEE#9/4/CHEN/AEGILOPS SQUARROSA (TAUS)/BCN/5/BABAX/LR42//BABAX	CMSS02M00215S-030M-5Y-0M-0Y	MXI06-07\Mult29ESWYT32
VORB/FISCAL	CMSS02M00393S-030M-11Y-0M-0Y	MXI06-07\Mult29ESWYT76
CHIBIA//PRLI/CM65531/3/FISCAL	CMSS02M00406S-030M-4Y-0M-0Y	MXI06-07\Mult29ESWYT77
CHIBIA//PRLI/CM65531/3/KAUZ/BAV92	CMSS02M00408S-030M-13Y-0M-0Y	MXI06-07\Mult29ESWYT79

Table 4. Mean values for yield and other traits of the wheat genotypes tested in the 29<sup>th</sup> ESWYT in 2008-2009 at Kabul, Afghanistan

Entry No.	Variety Name/Pedigree	Grain Yield			Days to Heading	Plant Height	Agronomic Score	1000 GWT	Yellow Rust	Field Selection
		kg/ha	Rank	% of Check						
101	LOCAL CHECK (Ariana 07)	5842	15	100	135	85	4	40	0	
102	PBW343	5123	33	88	132	73	4	44	100 S	
103	ROELFS F2007	5209	28	89	134	92	3	35	60 MS	
104	PRL/2*PASTOR	5786	17	99	134	86	3	35	5 R	
105	MILAN/S87230//BAV92	4358	47	75	133	84	3	46	0	
106	SITE/MO//PASTOR/3/TILHI	7054	1	121	132	85	4		10 MR	
107	NAC/THAC/3*PVN/3/MIRLO/BUC/4/2*PASTOR	6500	5	111	135	87	4	35	0	
108	MILAN/ARA90//TNMU/TUI	5186	31	89	131	81	4	35	40 S	
109	INQALAB 91*2/TUKURU	5378	24	92	134	87	4		60 S	
110	OASIS/KAUZ//4*BCN/3/2*PASTOR	4330	48	74	132	82	4		0	
111	FRET2/TUKURU//FRET2	5171	32	89	130	80	3		5 R	
112	WBLL1*2/KKTS	4802	41	82	130	81	4		60 MS	
113	WAXWING/4/SNI/TRAP#1/3/KAUZ*2/TRAP//KAUZ	5198	29	89	130	87	4	48	80 S	
114	OTUS/KKTS//KKTS	5325	26	91	131	81	4		0	
115	BABAX/LR42//BABAX*2/4/SNI/TRAP#1/3/KAUZ*2/TRAP//KAUZ	6109	11	105	135	82	4	44	10 R	
116	BABAX/LR42//BABAX*2/3/KUKUNA	4897	39	84	134	88	3		80 S	
117	WAXWING*2/BRAMBLING	5771	19	99	132	85	4		80 S	
118	PAURAUQUE	5326	25	91	132	83	4		80 S	
119	FRANCOLIN #1	5746	20	98	131	88	4	39	5 R	
120	FRANCOLIN	5303	27	91	132	83	5		100 S	
121	GRACKLE #1	4881	40	84	133	86	4		100 S	
122	GRACKLE	5892	14	101	134	85	4	40	100 S	
123	WAXWING*2/TUKURU	6149	9	105	131	85	4		5 R	
124	WAXWING*2/TUKURU	5967	2	119	131	88	5		10 TR	
125	WBLL1*2/BRAMBLING	5840	16	100	133	86	4	48	40 MS	
126	WBLL1*2/BRAMBLING	4720	43	81	135	91	3	40	40 MS	
127	WBLL1*2/BRAMBLING	5052	37	86	131	86	3	44	80 S	
128	WBLL1*2/BRAMBLING	5096	34	87	133	86	4		40 MS	
129	BECARD #1	5084	35	87	130	85	4		80 S	
130	TACUPETO F2001*2/BRAMBLING	5536	21	95	130	88	4	46	60 S	
131	MUU #1	5054	36	87	131	81	4		60 S	
132	MUU	5515	23	94	130	82	4		40 MS	
133	ELVIRA/5/CNDO/R143//ENTE/MEX175/3/AE.SQ/4/2*OCI	6187	8	106	132	83	5		10 MR	
134	THELIN/3/BABAX/LR42//BABAX/4/BABAX/LR42//BABAX	6190	7	106	134	82	5		60 MS	
135	THELIN#2//ATILTA*2/PASTOR/3/PRL/2*PASTOR	4105	49	70	135	81	4		0	
136	KIRITATI//PBW65/2*SERLIB	4361	46	75	134	84	4		60 MS	

137	KIRITATI//PRL/2*PASTOR	4665	45	80	128	90	4		TR
138	KIRITATI//PRL/2*PASTOR	6009	13	103	135	91	5	48	10 R
139	KIRITATI//HUW234+LR34/PRINIA	5198	30	89	134	88	3		60 MS
140	KIRITATI//WBL1	4743	42	81	128	81	4	44	80 S
141	PFAU//SERLIB//AMAD/3/WAXWING	6861	4	117	133	83	4		10 R
142	PFAU//MILAN//FISCAL	6136	10	105	135	84	4		0
143	SKAUZ*2//FCT//FISCAL	6928	3	119	134	85	4		0
144	VEE/PJN//KAUZ/3/PASTOR/4/FISCAL	6013	12	103	133	82	4	39	TR
145	PRL/2*PASTOR/3/MILAN//CHIL//CHUM18	6310	6	108	131	83	4		20 MS
146	SW89.5193//KAUZ/3//CHIBIA//PRLII//CM65531	3413	50	58	131	78	3		60 MS
147	MUNIA//CHTO/3//PFAU//BOW//VEE#9/4//CHEN//AEGILOPS SQUARROSA(TAUS)//BCN/5//BABAX//LR42//BABAX	4956	38	85	130	78	4		60 MS
148	VORB//FISCAL	5785	18	99	134	90	4		0
149	CHIBIA//PRLII//CM65531/3//FISCAL	4675	44	80	133	78	4		5 R
150	CHIBIA//PRLII//CM65531/3//SKAUZ//BAV92	5529	22	95	131	82	4		0

Mean		5445			132	84			
Max		7054			135	92			
Min		3413			128	73			
EMS		671306			0.653061	19.9928			
ESD <sub>0.05</sub>		1945.47			1.624	10.263			
F (Prob)		0.167			0	0.313			
CV %		15			0.6	5.3			

**Table 5: Mean values for yield and other traits of the wheat genotypes tested in the 29<sup>th</sup> ESWYT in 2008-2009 at Baghlan, Afghanistan**

Entry No.	Variety Name/Pedigree	Grain Yield			Days to Heading	Plant Height (cm)	Field Selection
		kg/ha	Rank	% of Check			
101	LOCAL CHECK (Ghori 96)	4572	49	100	98	111	
102	PBW343	7218	3	158	94	95	
103	ROELFS F2007	4999	43	109	99	114	
104	PRL/2*PASTOR	5232	42	114	96	96	
105	MILAN/S87230//BAV92	6843	10	150	98	105	
106	SITE/MO//PASTOR/3/TILHI	5638	35	123	97	113	
107	NAC/TH.AC//3*PVN/3/MIRLO/BUC/4/2*PASTOR	4671	48	102	103	99	
108	MILAN/ARA90//TNMU/TUI	5649	34	124	96	96	
109	INQALAB 91*2/TUKURU	5836	29	128	97	116	
110	OASIS/SKAUZ//4*BCN/3/2*PASTOR	6903	8	151	96	106	
111	FRET2/TUKURU//FRET2	6780	12	148	93	108	
112	WBLL1*2/KKTS	7263	2	159	94	102	
113	WAXWING/4/SNI/TRAP#1/3/KAUZ*2/TRAP//KAUZ	6982	6	153	90	107	
114	OTUS/KKTS//KKTS	6324	20	138	93	101	
115	BABAX/LR42//BABAX*2/4/SNI/TRAP#1/3/KAUZ*2/TRAP//KAUZ	5941	28	130	101	101	
116	BABAX/LR42//BABAX*2/3/KUKUNA	5618	36	123	97	114	
117	WAXWING*2/BRAMBLING	5430	38	119	99	113	
118	PAURAQUE	4992	44	109	95	113	
119	FRANCOLIN #1	5535	37	121	93	105	
120	FRANCOLIN	5779	32	126	93	99	
121	GRACKLE #1	6361	18	139	98	103	
122	GRACKLE	7166	4	157	101	110	
123	WAXWING*2/TUKURU	6003	27	131	97	116	
124	WAXWING*2/TUKURU	4386	50	96	93	111	
125	WBLL1*2/BRAMBLING	7107	5	155	95	114	
126	WBLL1*2/BRAMBLING	6718	14	147	97	113	
127	WBLL1*2/BRAMBLING	6085	26	133	90	109	
128	WBLL1*2/BRAMBLING	6138	25	134	95	114	
129	BECARD #1	6330	19	138	90	107	
130	TACUPETO F2001*2/BRAMBLING	5321	40	116	90	108	
131	MUU #1	6291	21	138	95	100	
132	MUU	5718	33	125	91	112	
133	ELVIRA/5/CNDO/R143//ENTE/MEXI75/3/AE.SQ/4/2*OCI	6557	16	143	98	104	
134	THELIN/3/BABAX/LR42//BABAX/4/BABAX/LR42//BABAX	6496	17	142	96	109	
135	THELIN#2//ATTILA*2/PASTOR/3/PRL/2*PASTOR	6719	13	147	95	93	
136	KIRITATI/PBW65/2*SERI.1B	5336	39	117	91	111	



137	KIRITATI//PRL/2*PASTOR	6176	23	135	89	111	
138	KIRITATI//PRL/2*PASTOR	6160	24	135	97	108	
139	KIRITATI//HUW234+LR34//PRINIA	4832	47	106	95	117	
140	KIRITATI//WBLL1	7314	1	160	91	111	
141	PFAU//SERI.1B//AMAD/3//WAXWING	6877	9	150	95	94	
142	PFAU//MILAN//FISCAL	5285	41	116	104	107	
143	SKAUZ*2//FCT//FISCAL	4860	46	106	99	106	
144	VEE//P/JN//KAUZ/3//PASTOR/4//FISCAL	4919	45	108	98	117	
145	PRL/2*PASTOR/3//MILAN//KAUZ//CHIL//CHUM18	6980	7	153	92	105	
146	SW89.5193//KAUZ/3//CHIBIA//PRLII//CM65531	6828	11	149	94	109	
147	MUNIA//CHTO/3//PFAU//BOW//VEE#9/4//CHEN//AEGILOPS SQUARROSA(TAUS)//BCN/5//BABAX//LR42//BABAX	6203	22	136	92	106	
148	VORB//FISCAL	6681	15	146	102	111	
149	CHIBIA//PRLII//CM65531/3//FISCAL	5808	31	127	97	100	
150	CHIBIA//PRLII//CM65531/3//SKAUZ//BAV92	5816	30	127	97	105	

Mean		6033			96	107	
Max		7314			104	117	
Min		4386			89	93	
EMS		1039700			2.9	60.2	
LSD <sub>0.05</sub>		2049.767			3.682	16.629	
F (Prob)		0.254			0	0.263	
CV %		17			2	7	

**Table 6: Mean values for yield and other traits of the wheat genotypes tested in the 29<sup>th</sup> ESWYT in 2008-2009 at Kunduz, Afghanistan**

Entry No.	Variety Name/Pedigree	Grain Yield			Days to		Lodging	Field Selection
		kg/ha	Rank	% of Check	Heading	Height		
101	LOCAL CHECK (Darulaman-07)	3812	49	100	102	105	65	
102	PBW343	6247	2	164	88	103	16	
103	ROELFS F2007	5707	9	150	91	110	26	
104	PRL/2*PASTOR	5692	10	149	90	103	40	
105	MILAN/S87230//BAV92	5247	25	138	90	105	26	
106	SITE/MO//PASTOR/3/TILHI	4578	41	120	91	105	32	
107	NAC/TH.AC//3*PVN/3/MIRLO/BUC/4/2*PASTOR	4404	47	116	99	110	38	
108	MILAN/ARA90//TNMU/TUI	5152	27	135	90	100	36	
109	INQALAB 91*2/TUKURU	4907	36	129	90	113	93	
110	OASIS/KAUZ//4*BCN/3/2*PASTOR	5898	6	155	90	108	22	
111	FRET2/TUKURU//FRET2	6078	5	159	88	110	66	
112	WBLI*2/KKTS	5653	11	148	88	108	89	
113	WAXWING/4/SNI/TRAP#1/3/KAUZ*2/TRAP//KAUZ	5569	13	146	87	103	96	
114	OTUS/KKTS//KKTS	5399	22	142	89	103	74	
115	BABAX/LR42//BABAX*2/4/SNI/TRAP#1/3/KAUZ*2/TRAP//KAUZ	5603	12	147	98	108	11	
116	BABAX/LR42//BABAX*2/3/KUKUNA	5330	24	140	90	113	31	
117	WAXWING*2/BRAMBLING	4882	37	128	95	108	41	
118	PAURQUE	5443	18	143	93	105	97	
119	FRANCOLIN #1	4500	43	118	87	98	61	
120	FRANCOLIN	5385	23	141	89	100	60	
121	GRACKLE #1	4934	32	129	97	103	49	
122	GRACKLE	4188	48	110	100	108	97	
123	WAXWING*2/TUKURU	3356	50	88	89	103	92	
124	WAXWING*2/TUKURU	4555	42	119	90	110	100	
125	WBLI*2/BRAMBLING	4453	44	117	89	105	68	
126	WBLI*2/BRAMBLING	5427	20	142	91	118	28	
127	WBLI*2/BRAMBLING	5009	30	131	85	120	89	
128	WBLI*2/BRAMBLING	4728	39	124	90	113	74	
129	BECARD #1	5849	7	153	86	98	87	
130	TACUPETO F2001*2/BRAMBLING	6120	4	161	87	108	76	
131	MUU #1	4911	35	129	88	110	75	
132	MUU	4695	40	123	86	105	56	
133	ELVIRA/5/CNDO/R143//ENTE/MEX175/3/AE.SQ/4/2*OCI	5408	21	142	92	105	58	
134	THELIN/3/BABAX/LR42//BABAX/4/BABAX/LR42//BABAX	5072	29	133	89	110	59	
135	THELIN#2//ATTILA*2/PASTOR/3/PRL/2*PASTOR	4918	34	129	90	103	69	
136	KIRITATI//PBW65/2*SERI.1B	4418	45	116	88	120	74	

137	KIRITATI//PRL/2*PASTOR	5498	14	144	86	105	96
138	KIRITATI//PRL/2*PASTOR	5201	26	136	90	110	84
139	KIRITATI//HUW234+LR34/PRINIA	4407	46	116	89	105	99
140	KIRITATI//WBLL1	5482	15	144	87	108	25
141	PFAU//SERI.1B//AMAD/3/WAXWING	6415	1	168	89	108	44
142	PFAU//MILAN//FISCAL	5076	28	133	96	108	31
143	SKAUZ*2/FCT//FISCAL	5437	19	143	91	115	94
144	VEE//PJM//KAUZ/3/PASTOR/4/FISCAL	5464	17	143	92	110	101
145	PRL/2*PASTOR/3/MILAN//CHIL/CHUM18	4965	31	130	87	115	64
146	SW89.5193//KAUZ/3/CHIBIA//PRLII//CM65531	5811	8	152	89	103	55
147	MUNIA//CHTO/3/PFAU//BOW//VEE#9/4/CHEN//AEGILOPS SQUARROSA (TAUS)//BCN/5/BABAX/LR42//BABAX	6198	3	163	87	103	46
148	VORB//FISCAL	5481	16	144	95	100	61
149	CHIBIA//PRLII//CM65531/3/FISCAL	4817	38	126	91	108	72
150	CHIBIA//PRLII//CM65531/3//SKAUZ//BAV92	4932	33	129	90	105	81

Mean		5174			90	107	62
Max		6415			102	120	101
Min		3356			85	98	11
EMS		274435			1.75862	49.3929	590.2
LSD <sub>0.05</sub>		1155.7			2.8	14.1	49.9
F (Prob)		0.001			0	0.407	0.003
CV %		10			1	7	39

**Table 7: Mean values for yield and other traits of the wheat genotypes tested in the 29<sup>th</sup> ESWYT in 2008-2009 at Takhar, Afghanistan**

Entry No.	Variety Name/Pedigree	Grain Yield			Days to		Plant Height (cm)	Field Selection
		kg/ha	Rank	% of Check	Heading	Maturity		
I01	LOCAL CHECK (Lalmi-2)	6924	21	Check	108	156	99	
I02	PBW343	5826	47	84	103	150	99	
I03	ROELFS F2007	7545	7	109	107	152	114	
I04	PRL/2*PASTOR	7626	6	110	106	153	104	
I05	MILAN/S87230//BAV92	6749	26	97	104	151	111	
I06	SITE/MO//PASTOR/3/TILHI	7179	15	104	105	152	106	
I07	NAC/TH.AC//3*PVN/3/MIRLO/BUC/4/2*PASTOR	7438	11	107	108	153	110	
I08	MILAN/ARA90//TNMU/TUI	6017	43	87	104	152	103	
I09	INQALAB 91*2/TUKURU	6804	22	98	104	151	117	
I10	OASIS/KAUZ//4*BCN/3/2*PASTOR	6294	37	91	105	150	102	
I11	FRET2/TUKURU//FRET2	7044	19	102	102	151	108	
I12	WBLL1*2/KKTS	6615	28	96	102	150	106	
I13	WAXWING/4/SNI/TRAP#1/3/KAUZ*2/TRAP//KAUZ	6195	39	89	100	150	114	
I14	OTUS/KKTS//KKTS	6759	25	98	104	151	99	
I15	BABAX/LR42//BABAX*2/4/SNI/TRAP#1/3/KAUZ*2/TRAP//KAUZ	7862	4	114	107	152	103	
I16	BABAX/LR42//BABAX*2/3/KUKUNA	7841	5	113	107	157	108	
I17	WAXWING*2/BRAMBLING	7446	10	108	106	151	105	
I18	PAURAUQUE	7342	12	106	105	152	106	
I19	FRANCOLIN #1	7341	13	106	104	152	101	
I20	FRANCOLIN	7051	18	102	105	151	109	
I21	GRACKLE #1	8928	1	129	108	152	108	
I22	GRACKLE	8307	3	120	108	152	105	
I23	WAXWING*2/TUKURU	7513	9	109	104	151	109	
I24	WAXWING*2/TUKURU	8894	2	128	105	151	113	
I25	WBLL1*2/BRAMBLING	7111	17	103	106	153	115	
I26	WBLL1*2/BRAMBLING	6619	27	96	107	152	113	
I27	WBLL1*2/BRAMBLING	7188	14	104	102	152	111	
I28	WBLL1*2/BRAMBLING	7140	16	103	105	154	102	
I29	BECARD #1	5851	46	84	102	151	101	
I30	TACUPETO F2001*2/BRAMBLING	6769	24	98	102	151	111	
I31	MUU #1	6462	33	93	105	151	104	
I32	MUU	6031	42	87	103	150	107	
I33	ELVIRA/5/CNDO/R143//ENTE/MEXI75/3/AE.SQ/4/2*OCI	6316	36	91	108	154	101	
I34	THELIN/3/BABAX/LR42//BABAX/4/BABAX/LR42//BABAX	5086	50	73	106	152	108	
I35	THELIN#2//ATTILA*2/PASTOR/3/PRL/2*PASTOR	6014	44	87	106	155	113	
I36	KIRITATI//PBW65/2*SERI.1B	6115	41	88	103	151	114	

F37	KIRITATI//PRL/2*PASTOR	6135	40	89	100	150	111	
F38	KIRITATI//PRL/2*PASTOR	6355	35	92	106	152	107	
F39	KIRITATI//HUV234+LR34/PRINIA	6237	38	90	105	151	115	
F40	KIRITATI/WBLLI	5770	49	83	102	151	105	
F41	PFAU/SERLIB//AMAD/3/WAXWING	6602	29	95	103	151	103	
F42	PFAU/MILAN//FISCAL	6499	31	94	109	153	108	
F43	SKAUZ*2/FCT//FISCAL	6797	23	98	106	152	111	
F44	VEE/PJN//KAUZ/3/PASTOR/4/FISCAL	6431	34	93	108	152	108	
F45	PRL/2*PASTOR/3/MILAN/KAUZ//CHIL/CHUM18	6528	30	94	102	151	107	
F46	SW89.5193/KAUZ/3/CHIBIA//PRLII/CM65531	5957	45	86	103	151	100	
F47	MUNIA/CHTO/3/PFAU/BOW//VEE#9/4/CHEN/ AEGILOPS SQUARROSA (TAUS)//BCN/5/BABAX/LR42//BABAX	6486	32	94	103	150	100	
F48	VORB/FISCAL	7541	8	109	108	151	111	
F49	CHIBIA//PRLII/CM65531/3/FISCAL	5814	48	84	104	150	107	
F50	CHIBIA//PRLII/CM65531/3/SKAUZ/BAV92	7043	20	102	105	151	105	

Mean		6809			105	152	107	
Max		8928			109	157	117	
Min		5086			100	150	99	
EMS		376454			0.61	1.41	12.06	
ESD <sub>0.05</sub>		1310.04			1.69	2.45	7.95	
P (Prob)		0.001			0	0	0	
CV %		9			1	1	3	

Table8: Mean values for yield and other traits of the wheat genotypes tested in the 29<sup>th</sup> ESWYT in 2008-2009 at Balkh, Afghanistan

Entry No.	Variety	Grain Yield			Days to		Plant Height (cm)	%	Stripe Rust	Field Selection
		Kg/ha	Rank	% of Check	Heading	Maturity				
101	LOCAL CHECK (Amu-99)	7262	17	100	139	186	95	95	40S	
102	PBW343	6887	30	95	134	181	87	94	10MR	
103	ROELFS F2007	7636	8	105	134	184	107	94	0	
104	PRL/2*PASTOR	7424	12	102	131	184	100	95	0	
105	MILAN/S87230//BAV92	6263	43	86	135	183	95	95	0	
106	SITE/MO//PASTOR/3/TILHI	6897	29	95	134	185	93	95	0	
107	NAC/THAC//3*PVN/3/MIRLO/BUC/4/2*PASTOR	6915	27	95	139	185	103	95	0	
108	MILAN/ARA90//TNMU/TUI	6521	41	90	132	181	101	95	0	
109	INQALAB 91*2/TUKURU	6545	40	90	132	183	104	95	10MR	
110	OASIS/KAUZ//4*BCN/3/2*PASTOR	7183	20	99	132	181	97	95	0	
111	FRET2/TUKURU//FRET2	7033	24	97	130	184	98	94	0	
112	WBL1*2/KKTS	6800	34	94	130	180	110	95	0	
113	WAXWING/4/SNI/TRAP#1/3/KAUZ*2/TRAP//KAUZ	7135	22	98	130	180	99	95	10MR	
114	OTUS/KKTS//KKTS	6825	31	94	136	180	96	95	0	
115	BABAX/LR42//BABAX*2/4/SNI/TRAP#1/3/KAUZ*2/TRAP//KAUZ	7731	7	106	138	184	111	94	0	
116	BABAX/LR42//BABAX*2/3/KUKUNA	5863	47	81	135	184	107	95	15MR	
117	WAXWING*2//BRAMBLING	6373	42	88	137	184	97	94	0	
118	PAURAUQUE	6137	44	85	135	183	107	94	0	
119	FRANCOLIN #1	3420	50	47	134	182	73	94	0	
120	FRANCOLIN	7340	15	101	133	183	105	94	5R	
121	GRACKLE #1	8023	3	110	137	185	104	95	10MR	
122	GRACKLE	7309	16	101	138	187	97	95	0	
123	WAXWING*2/TUKURU	6824	32	94	133	185	97	95	0	
124	WAXWING*2/TUKURU	6798	35	94	135	185	100	95	0	
125	WBL1*2//BRAMBLING	8421	1	116	135	184	108	95	0	
126	WBL1*2//BRAMBLING	7591	10	105	137	185	115	94	0	
127	WBL1*2//BRAMBLING	7482	11	103	130	182	114	95	0	
128	WBL1*2//BRAMBLING	6904	28	95	136	185	107	94	5R	
129	BECARD #1	7193	18	99	130	182	78	94	0	
130	TACUPETO F2001*2//BRAMBLING	7958	5	110	132	182	102	95	5R	
131	MUU #1	5748	48	79	132	182	96	95	0	
132	MUU	6627	38	91	130	182	103	95	0	
133	ELVIRA/5/CNDO/R143//ENTE/MEXI75/3/AE.SQ/4/2*OCI	7601	9	105	133	186	102	95	0	
134	THELIN/3/BABAX/LR42//BABAX/4/BABAX/LR42//BABAX	7187	19	99	135	184	94	95	0	
135	THELIN#2//ATTILA*2/PASTOR/3/PRL/2*PASTOR	6980	25	96	133	184	101	95	0	
136	KIRITATI/PBW65/2*SERI.1B	6706	37	92	132	184	94	95	0	

137	KIRITATI//PRL/2*PASTOR	6974	26	96	124	180	103	95	0
138	KIRITATI//PRL/2*PASTOR	5918	46	81	132	184	103	95	0
139	KIRITATI//HUW234+LR34/PRINIA	5552	49	76	130	184	100	95	0
140	KIRITATI/WBLL1	7380	14	102	130	181	106	95	0
141	PFAU/SERI.1B//AMAD/3/WAXWING	8379	2	115	130	185	104	95	0
142	PFAU/MILAN//FISCAL	6743	36	93	139	185	105	95	0
143	SKAUZ*2/FCT//FISCAL	6004	45	83	136	184	108	94	0
144	VEE/PJN//KAUZ/3/PASTOR/4/FISCAL	6820	33	94	136	185	100	94	0
145	PRL/2*PASTOR/3/MILAN/KAUZ//CHIL/CHUM18	7404	13	102	131	184	104	95	0
146	SW89.5193/KAUZ/3/CHIBIA//PRLII/CM65531	8004	4	110	134	181	96	95	0
147	MUNIA/CHTO/3/PFAU/BOW//VEE#9/4/CHEN/AEGILOPS SQUARROSA (TAUS)//BCN/5/BABAX/LR42//BABAX	7763	6	107	133	182	92	94	0
148	VORB/FISCAL	7164	21	99	137	185	118	95	0
149	CHIBIA//PRLII/CM65531/3/FISCAL	6554	39	90	136	179	97	94	0
150	CHIBIA//PRLII/CM65531/3/KAUZ/BAV92	7054	23	97	136	183	107	94	0

Mean		6945			134	183	101	95	
Max		8421			139	187	118	95	
Min		3420			124	179	73	94	
RMS		455462			4.29619	1.87208	61.2071	0.23424	
ESD <sub>0.05</sub>		1456.339			4.417	2.914	16.866	0.987	
F (Prob)		0.002			0	0	0.009	0.181	
CV %		10			2	1	8	1	

**Table 9: Mean values for yield and other traits of the wheat genotypes tested in the 29<sup>th</sup> ESWYT in 2008-2009 at Herat, Afghanistan**

Entry No.	Variety Name/Pedigree	Grain Yield			Days to		Plant Height (cm)	Agronomic Score	Check Mark	Field Selection
		kg/ha	Rank	% of Check	Heading	Maturity				
101	LOCAL CHECK (	5362	48	Check	106	158	116	3	**	
102	PBW343	7625	8	142	102	148	93	.		
103	ROELFS F2007	7034	30	131	105	149	119	5	***	
104	PRL/2*PASTOR	7363	13	137	104	153	100	5	***	
105	MILAN/S87230//BAV92	6922	36	129	105	159	105	5	***	
106	SITE/MO//PASTOR/3/TILHI	6997	32	130	105	152	105	5	***	
107	NAC/TH.AC/3*PVN/3/MIRLO/BUC/4/2*PASTOR	7177	24	134	112	156	116	5	***	
108	MILAN/ARA90//TNMU/TUI	6300	43	117	103	154	95	3	**	
109	INQALAB 91*2/TUKURU	6622	40	123	104	156	119	3	**	
110	OASIS/SKAUZ//4*BCN/3/2*PASTOR	8071	3	151	103	152	108	3	**	
111	FRET2/TUKURU//FRET2	6291	44	117	102	148	117	3	**	
112	WBL1*2/KKTS	7750	6	145	102	146	111	5	***	
113	WAXWING/4/SNI/TRAP#1/3/KAUZ*2/TRAP//KAUZ	7384	11	138	100	149	113	5	***	
114	OTUS/KKTS//KKTS	6978	34	130	102	148	106	5	***	
115	BABAX/LR42//BABAX*2/4/SNI/TRAP#1/3/KAUZ*2/TRAP//KAUZ	7338	16	137	105	152	109	5	***	
116	BABAX/LR42//BABAX*2/3/KUKUNA	6523	42	122	104	152	121	3	**	
117	WAXWING*2/BRAMBLING	6996	33	130	105	150	110	5	***	
118	PAURAUQUE	7134	27	133	101	148	111	3	**	
119	FRANCOLIN #1	6034	47	113	100	148	107	3	**	
120	FRANCOLIN	6947	35	130	101	151	107	3	**	
121	GRACKLE #1	7796	5	145	106	154	115			
122	GRACKLE	7252	21	135	107	154	113	3	**	
123	WAXWING*2/TUKURU	6606	41	123	102	148	114	3	**	
124	WAXWING*2/TUKURU	6287	45	117	101	151	117	5	***	
125	WBL1*2/BRAMBLING	7424	10	138	104	148	118	5	***	
126	WBL1*2/BRAMBLING	7026	31	131	104	150	118	5	***	
127	WBL1*2/BRAMBLING	7217	22	135	100	147	116	5	***	
128	WBL1*2/BRAMBLING	7319	17	136	102	147	108	5	***	
129	BECARD #1	7340	14	137	100	146	113	3	**	
130	TACUPETO F2001*2/BRAMBLING	7306	18	136	98	147	123	5	***	
131	MUU #1	7597	9	142	102	150	109			
132	MUU	7130	28	133	101	150	108	3	**	
133	ELVIRA/5/CNDO/R143//ENTE/MEX175/3/AE.SQ/4/2*OCI	8077	2	151	103	148	109	5	***	
134	THELIN/3/BABAX/LR42//BABAX/4/BABAX/LR42//BABAX	7279	19	136	102	147	108	3	**	
135	THELIN#2//ATTILA*2/PASTOR/3/PRL/2*PASTOR	6647	39	124	102	147	118	5	***	
136	KIRITATI/PBW65/2*SERI.1B	6147	46	115	101	152	114	5	***	



137	KIRITATI//PRL/2*PASTOR	4694	49	88	98	147	115			
138	KIRITATI//PRL/2*PASTOR	6758	37	126	103	147	115	5	***	
139	KIRITATI//HUW234+LR34/PRINIA	4651	50	87	103	146	126			
140	KIRITATI/WBLL1	6695	38	125	101	148	113	3	**	
141	PFAU/SERI.1B//AMAD/3/WAXWING	8147	1	152	102	146	114	5	***	
142	PFAU/MILAN//FISCAL	8017	4	150	109	150	109	5	***	
143	SKAUZ*2/FCT//FISCAL	7137	26	133	105	146	120	5	***	
144	VEE/PJN//KAUZ/3/PASTOR/4/FISCAL	7215	23	135	106	146	110	3	**	
145	PRL/2*PASTOR/3/MILAN/KAUZ//CHIL/CHUM18	7376	12	138	101	149	119	5	***	
146	SW89.5193/KAUZ/3/CHIBIA//PRLII/CM65531	7686	7	143	102	147	101	3	**	
147	MUNIA/CHTO/3/PFAU/BOW//VEE#9/4/CHEN/AEGILOPS SQUARROSA (TAUS)/BCN/5/BABAX/LR42//BABAX	7176	25	134	101	146	95	3	**	
148	VORB/FISCAL	7338	15	137	107	146	117	5	***	
149	CHIBIA//PRLII/CM65531/3/FISCAL	7111	29	133	104	150	107	3	**	
150	CHIBIA//PRLII/CM65531/3/SKAUZ/BAV92	7273	20	136	104	150	107	3	**	

Mean		7011			103	150	112			
Max		8147			112	159	126			
Min		4651			98	146	93			
EMS		136943			7.84E-02	0.832857	0.49			
ESD <sub>0.05</sub>		864.117			0.562	1.834	1.407			
F (Prob)		0			0	0	0			
CV %		5			0	1	1			

**Table 10: Mean values for yield and other traits of the wheat genotypes tested in the 29<sup>th</sup> ESWYT in 2008-2009 at Nangarhar, Afghanistan**

Entry No.	Variety	Grain Yield			Days to Heading	Plant Height (cm)	% Stand	Agronomic Score	Field Selection
		kg/ha	Rank	% of Check					
101	LOCAL CHECK (Herat-99)	2114	49	100	115	112	96	4	
102	PBW343	3464	12	164	118	95	85	2	
103	ROELFS F2007	2968	29	140	117	115	84	2	
104	PRL/2*PASTOR	3191	20	151	116	102	87	2	
105	MILAN/S87230//BAV92	2994	27	142	116	105	89	3	
106	SITE/MO//PASTOR/3/TILHI	3439	13	163	116	110	91	4	
107	NAC/TH.AC//3*PVN/3/MIRLO/BUC/4/2*PASTOR	2473	44	117	123	110	89	2	
108	MILAN/ARA90//TNMU/TUI	4019	4	190	116	103	90	3	
109	INQALAB 91*2/TUKURU	2159	48	102	116	113	87	4	
110	OASIS/KAUZ//4*BCN/3/2*PASTOR	4092	3	194	116	108	94	3	
111	FRET2/TUKURU//FRET2	2540	41	120	114	107	92	3	
112	WBL1*2/KKTS	3466	11	164	114	107	93	3	
113	WAXWING/4/SNI/TRAP#1/3/KAUZ*2/TRAP//KAUZ	3125	22	148	112	102	92	3	
114	OTUS/KKTS//KKTS	3304	15	156	115	97	90	3	
115	BABAX/LR42//BABAX*2/4/SNI/TRAP#1/3/KAUZ*2/TRAP//KAUZ	2984	28	141	122	100	92	2	
116	BABAX/LR42//BABAX*2/3/KUKUNA	2504	42	118	119	105	87	3	
117	WAXWING*2/BRAMBLING	3085	24	146	122	103	85	3	
118	PAURAUQUE	3223	18	152	114	100	80	4	
119	FRANCOLIN #1	3477	9	164	114	93	61	4	
120	FRANCOLIN	3824	6	181	115	103	88	5	
121	GRACKLE #1	3287	17	155	121	108	93	3	
122	GRACKLE	3473	10	164	116	100	89	3	
123	WAXWING*2/TUKURU	2739	37	130	115	105	90	5	
124	WAXWING*2/TUKURU	2954	31	140	114	108	95	4	
125	WBL1*2/BRAMBLING	2611	40	123	115	113	84	4	
126	WBL1*2/BRAMBLING	3877	5	183	119	115	86	4	
127	WBL1*2/BRAMBLING	4542	2	215	113	110	83	3	
128	WBL1*2/BRAMBLING	2714	38	128	114	110	87	3	
129	BECARD #1	2692	39	127	113	102	87	3	
130	TACUPETO F2001*2/BRAMBLING	2744	36	130	113	115	87	4	
131	MUU #1	2240	47	106	117	110	91	2	
132	MUU	2046	50	97	114	100	94	3	
133	ELVIRA/5/CNDO/R143//ENTE/MEXI75/3/AE.SQ/4/2*OCI	3493	8	165	120	110	92	4	
134	THELIN/3/BABAX/LR42//BABAX/4/BABAX/LR42//BABAX	2358	46	112	114	97	88	2	
135	THELIN#2//ATTILA*2/PASTOR/3/PRL/2*PASTOR	2782	35	132	115	110	91	4	
136	KIRITATI//PBW65/2*SERI.IB	3061	25	145	113	105	88	4	

137	KIRITATI//PRL/2*PASTOR	2963	30	140	111	110	96	2	
138	KIRITATI//PRL/2*PASTOR	2443	45	116	114	102	99	2	
139	KIRITATI//HUW234+LR34/PRINIA	2493	43	118	113	107	97	2	
140	KIRITATI//WBLL1	4549	1	215	112	105	91	3	
141	PFAU//SERI.1B//AMAD/3/WAXWING	2872	33	136	113	105	94	5	
142	PFAU//MILAN//FISCAL	3349	14	158	120	108	93	5	
143	SKAUZ*2/FCT//FISCAL	2882	32	136	116	110	89	3	
144	VEE//P/JN//KAUZ/3/PASTOR/4/FISCAL	3298	16	156	115	108	91	3	
145	PRL/2*PASTOR/3/MILAN/KAUZ//CHIL/CHUM18	3218	19	152	111	103	94	2	
146	SW89.5193//KAUZ/3/CHIBIA//PRLII/CM65531	3190	21	151	116	100	89	4	
147	MUNIA//CHTO/3/PFAU//BOW//VEE#9/4/CHEN/AEGILOPS SQUARROSA (TAUS)//BCN/5/BABAX/LR42//BABAX	3570	7	169	112	95	89	3	
148	VORB//FISCAL	3091	23	146	115	110	88	2	
149	CHIBIA//PRLII/CM65531/3//FISCAL	3022	26	143	115	100	89	2	
150	CHIBIA//PRLII/CM65531/3//SKAUZ//BAV92	2799	34	132	115	102	91	2	

Mean		3076			115	105	89		
Max		4549			123	115	99		
Min		2046			111	93	61		
EMS		260772			2.78479	22.7871	24.3076		
LSD <sub>0.05</sub>		1182.836			3.625	9.678	11.091		
F (Prob)		0.004			0	0.001	0.01		
CV %		16.6			1.4	4.5	5.5		

Table 11: Mean values for yield and other traits of the wheat genotypes tested in the 29<sup>th</sup> ESWYT in 2008-2009 at Helmand, Afghanistan

Entry No.	Variety Name/Pedigree	Grain Yield			Days to Heading	Plant Height (cm)	Agronomic Score	Field Selection
		kg/ha	Rank	% of Check				
101	LOCAL CHECK (Roshan-96)	11962	1	Check	90	100	5	
102	PBW343	9731	16	81	88	106	5	
103	ROELFS F2007	8000	39	67	90	101		
104	PRL2*PASTOR	9016	24	75	88	102	5	
105	MILAN/S87230//BAV92	6389	48	53	90	93		
106	SITE/MO//PASTOR/3/TILHI	9589	18	80	88	75	5	
107	NAC/TH.AC//3*PVN/3/MIRLO/BUC/4/2*PASTOR	9049	23	76	90	94	5	
108	MILAN/ARA90//TNMU/TUI	7503	44	63	88	90		
109	INQALAB 91*2/TUKURU	8940	27	75	90	93		
110	OASIS/KAUZ//4*BCN/3/2*PASTOR	10824	7	90	88	107	5	
111	FRET2/TUKURU//FRET2	8232	36	69	88	98	5	
112	WBL1*2/KKTS	6390	47	53	88	85		
113	WAXWING/4/SNI/TRAP#1/3/KAUZ*2/TRAP//KAUZ	8088	37	68	88	103	5	
114	OTUS/KKTS//KKTS	9142	22	76	88	87	5	
115	BABAX/LR42//BABAX*2/4/SNI/TRAP#1/3/KAUZ*2/TRAP//KAUZ	11022	6	92	101	93	5	
116	BABAX/LR42//BABAX*2/3/KUKUNA	10229	10	86	101	98	5	
117	WAXWING*2//BRAMBLING	9839	14	82	101	98	5	
118	PAURAUQUE	10629	8	89	90	96	5	
119	FRANCOLIN #1	7114	46	59	90	99	5	
120	FRANCOLIN	8915	28	75	90	83	5	
121	GRACKLE #1	11703	3	98	90	93	5	
122	GRACKLE	10348	9	87	90	99	5	
123	WAXWING*2/TUKURU	8444	34	71	88	95	5	
124	WAXWING*2/TUKURU	8569	30	72	88	96	5	
125	WBL1*2//BRAMBLING	9694	17	81	88	96	5	
126	WBL1*2//BRAMBLING	8508	33	71	101	108	5	
127	WBL1*2//BRAMBLING	5992	50	50	88	95		
128	WBL1*2//BRAMBLING	9532	19	80	90	95	5	
129	BECARD #1	8946	26	75	88	86	5	
130	TACUPETO F2001*2//BRAMBLING	8055	38	67	88	100	5	
131	MUU #1	9854	12	82	90	91	5	
132	MUU	8951	25	75	89	89	5	
133	ELVIRA/5/CNDO/R143//ENTE/MEXI75/3/AE.SQ/4/2*OCI	11769	2	98	90	96	5	
134	THELIN/3//BABAX/LR42//BABAX/4//BABAX/LR42//BABAX	11225	4	94	90	91	5	

135	THELIN#2//ATTILA*2/PASTOR/3/PRL/2*PASTOR	9310	20	78	101	106	5
136	KIRITATI//PBW65/2*SERI.1B	9172	21	77	88	104	5
137	KIRITATI//PRL/2*PASTOR	6044	49	51	88	95	
138	KIRITATI//PRL/2*PASTOR	11052	5	92	88	89	5
139	KIRITATI//HUW234+LR34/PRINIA	8552	31	71	88	94	5
140	KIRITATI/WBLL1	7882	40	66	88	89	
141	PFAU/SERI.1B//AMAD/3/WAXWING	7642	43	64	88	93	5
142	PFAU/MILAN/FISCAL	10204	11	85	90	101	5
143	SKAUZ*2/FCT//FISCAL	9845	13	82	90	103	5
144	VEE/PJN//KAUZ/3/PASTOR/4/FISCAL	9748	15	81	101	106	5
145	PRL/2*PASTOR/3/MILAN/KAUZ//CHEL/CHUM18	7142	45	60	88	91	5
146	SW89.5193//KAUZ/3/CHIBIA//PRLII/CM65531	8532	32	71	88	86	5
147	MUNIA/CHTO/3/PFAU/BOW//VEE#9/4/CHEN/AEGILOPS SQUARROSA (TAUS)//BCN/5/BABAX/LR42//BABAX	7829	42	65	88	83	5
148	VORB/FISCAL	8407	35	70	90	106	5
149	CHIBIA//PRLII/CM65531/3/FISCAL	8725	29	73	101	94	5
150	CHIBIA//PRLII/CM65531/3//SKAUZ/BAV92	7843	41	66	101	93	5

Mean		9003			91	95	
Max		11962			101	108	
Min		5992			88	75	
EMS		1068840			0.0	0.0	
LSD <sub>0.05</sub>		2383.356			0.402	0.35	
F (Prob)		0			0	0	
CV %		11			0	0	

Table 12: Combine Analyze of the 50 elite spring wheat genotypes tested in the 29<sup>th</sup> ESWYT at eight sites in 2008-2009 wheat seasons, Afghanistan

Entry No.	Grain Yield Kabul			Grain Yield Baghlan			Grain Yield Kunduz			Grain Yield Takhar			Grain Yield Nangarhar			Grain Yield Herat			Grain Yield Balkh			Grain Yield Helmand			Across Mean		
	kg/ha	Rank	% of Check	kg/ha	Rank	% of Check	kg/ha	Rank	% of Check	kg/ha	Rank	% of Check	kg/ha	Rank	% of Check	kg/ha	Rank	% of Check	Kg/ha	Rank	% of Check	kg/ha	Rank	% of Check	Kg/ha	Rank	% of Check
101	5842	15	100	4572	49	100	3812	49	100	6924	21	Check	2114	49	61	5362	48	Check	7262	17	100	11962	1	Check	5981	39	100
102	5123	33	88	7218	3	158	6247	2	164	5826	47	100	3464	12	100	7625	8	142	8887	30	95	9731	16	81	8515	8	109
103	5209	26	89	4999	43	109	5707	9	150	7545	7	129	2968	29	86	7034	30	131	7636	8	105	8000	39	67	6137	32	103
104	5786	17	99	5232	42	114	5692	10	149	7626	6	131	3191	20	92	7363	13	137	7424	12	102	9016	24	75	6416	11	107
105	4358	47	75	8843	10	150	5247	25	136	6749	26	116	2994	27	86	6922	36	129	6263	43	86	6389	48	53	5721	46	96
106	7054	1	121	5638	35	123	4578	41	120	7179	15	123	3439	13	99	6997	32	130	6897	29	95	9589	18	80	6421	10	107
107	6500	5	111	4671	48	102	4404	47	116	7438	11	128	2473	44	71	7177	24	134	6915	27	95	9049	23	76	6078	35	102
108	5186	31	89	5649	34	124	5152	27	135	6017	43	103	4019	4	116	6300	43	117	6521	41	90	7503	44	63	5793	45	97
109	5378	24	92	5836	29	128	4907	36	129	6804	22	117	2159	48	62	6622	40	123	6545	40	90	8940	27	75	5899	42	99
110	4330	48	74	6903	8	151	5898	6	155	6294	37	108	4092	3	118	8071	3	151	7183	20	99	10624	7	90	6699	6	112
111	5171	32	89	6780	12	148	6078	5	159	7044	19	121	2540	41	73	6291	44	117	7033	24	97	8232	36	69	6146	31	103
112	4802	41	82	7263	2	159	5653	11	148	6615	28	114	3466	11	100	7750	6	145	6800	34	94	6390	47	53	6092	34	102
113	5198	29	89	6982	6	153	5569	13	146	6195	39	106	3125	22	90	7384	11	138	7135	22	98	8088	37	68	6209	26	104
114	5325	26	91	6324	20	138	5399	22	142	6759	25	116	3304	15	95	6978	34	130	6825	31	94	9142	22	76	6257	18	105
115	6109	11	105	5941	28	130	5603	12	147	7862	4	135	2984	28	86	7338	16	137	7731	7	106	11022	6	92	6824	3	114
116	4897	39	84	5618	36	123	5330	24	140	7841	5	135	2504	42	72	6523	42	122	5863	47	81	10229	10	86	6101	33	102
117	5771	19	99	5430	38	119	4882	37	128	7446	10	128	3065	24	89	6996	33	130	6373	42	88	9639	14	82	6228	23	104
118	5326	25	91	4992	44	109	5443	18	143	7342	12	126	3223	18	93	7134	27	133	6137	44	85	10629	8	89	6278	16	105
119	5746	20	98	5535	37	121	4500	43	118	7341	13	126	3477	9	100	6034	47	113	3420	50	47	7114	46	59	5396	48	90
120	5303	27	91	5779	32	126	5385	23	141	7051	18	121	3824	6	110	6947	35	130	7340	15	101	8915	28	75	6318	14	106
121	4881	40	84	6361	18	139	4934	32	129	8928	1	153	3287	17	95	7796	5	145	8023	3	110	11703	3	98	6989	1	117
122	5892	14	101	7166	4	157	4188	48	110	8307	3	143	3473	10	100	7252	21	135	7309	16	101	10348	9	87	6742	4	113
123	6149	9	105	6003	27	131	3356	50	88	7513	9	129	2739	37	79	6606	41	123	6824	32	94	8444	34	71	5954	40	100
124	6967	2	119	4386	50	96	4555	42	119	8894	2	153	2954	31	85	6287	45	117	6798	35	94	8569	30	72	6176	29	103
125	5840	16	100	7107	5	155	4453	44	117	7111	17	122	2811	40	75	7424	10	138	8421	1	116	9694	17	81	6583	7	110
126	4720	43	81	6718	14	147	5427	20	142	6619	27	114	3877	5	112	7026	31	131	7591	10	105	8508	33	71	6311	15	106
127	5052	37	86	6085	26	133	5009	30	131	7188	14	123	4542	2	131	7217	22	135	7482	11	103	5992	50	50	6071	36	101
128	5096	34	87	6138	25	134	4728	39	124	7140	16	123	2714	38	78	7319	17	136	6904	28	95	9532	19	80	6196	27	104
129	5084	35	87	6330	19	138	5849	7	153	5851	46	100	2692	39	78	7340	14	137	7193	18	99	8946	26	75	6161	30	103
130	5536	21	95	5321	40	116	6120	4	161	6769	24	116	2744	36	79	7306	18	136	7958	5	110	8055	38	67	6226	25	104
131	5054	36	87	6291	21	138	4911	35	129	6462	33	111	2240	47	65	7597	9	142	5748	48	79	9854	12	82	6020	38	101
132	5515	23	94	5718	33	125	4695	40	123	6031	42	104	2046	50	59	7130	28	133	6627	38	91	8951	25	75	5839	43	98
133	6187	8	106	6557	16	143	5408	21	142	6316	36	108	3493	8	101	8077	2	151	7601	9	105	11769	2	98	6926	2	116
134	6190	7	106	6496	17	142	5072	29	133	5086	50	87	2358	46	68	7279	19	136	7187	19	99	11225	4	94	6362	13	106
135	4105	49	70	6719	13	147	4918	34	129	6014	44	103	2782	35	80	6647	39	124	6980	25	96	9310	20	78	5934	41	99
136	4361	46	75	5336	39	117	4418	45	116	6115	41	105	3061	25	88	6147	46	115	6706	37	92	9172	21	77	5664	47	95
137	4665	45	80	6176	23	135	5498	14	144	6135	40	105	2963	30	86	4694	49	88	6974	26	96	6044	49	51	5393	49	90
138	6009	13	103	6160	24	135	5201	26	136	6355	35	109	2443	45	71	6758	37	128	5918	46	81	11052	5	92	6237	21	104
139	5198	30	89	4832	47	106	4407	46	116	6237	38	107	2493	43	72	4651	50	87	5552	49	76	8552	31	71	5240	50	88
140	4743	42	81	7314	1	160	5482	15	144	5770	49	99	4549	1	131	6695	38	125	7380	14	102	7882	40	86	6227	24	104
141	6861	4	117	6877	9	150	6415	1	168	6602	29	113	2872	33	83	8147	1	152	8379	2	115	7642	43	64	6724	5	112
142	6136	10	105	5285	41	116	5076	28	133	6499	31	112	3349	14	97	8017	4	150	6743	36	93	10204	11	85	6414	12	107
143	6928	3	119	4860	46	106	5437	19	143	6797	23	117	2882	32	83	7137	26	133	6004	45	83	9845	13	82	6236	22	104
144	6013	12	103	4919	45	108	5464	17	143	6431	34	110	3298	16	95	7215	23	135	6820	33	94	9748	15	81	6238	20	104
145	6310	6	108	6980	7	153	4965	31	130	6528	30	112	3218	19	93	7376	12	138	7404	13	102	7142	45	60	6240	19	104

146	3413	50	58	6826	11	149	5811	8	152	5957	45	102	3190	21	92	7686	7	143	8004	4	110	8532	32	71	6178	28	103
147	4958	38	85	6203	22	138	6198	3	163	6486	32	111	3570	7	103	7176	25	134	7763	6	107	7829	42	65	6273	17	105
148	5765	18	99	6681	15	146	5481	16	144	7541	8	129	3091	23	80	7338	15	137	7164	21	99	8407	35	70	6436	9	106
149	4675	44	80	5608	31	127	4817	38	126	5814	48	100	3022	26	87	7111	29	133	6554	39	90	8725	29	73	5816	44	97
150	5529	22	95	5816	30	127	4932	33	129	7043	20	121	2799	34	81	7273	20	136	7954	23	97	7843	41	66	6036	37	101

Mean	5445			6033			5174			6809			3076			7011			6945			9003			6187		
Max	7054			7314			6415			8928			4549			8147			8421			11962			6989		
Min	3413			4386			3356			5086			2046			4651			3420			5992			5240		
EMS	671306			1039700			274435			376454			260772			136943			455462			1068840					
LSD0.05	1945.47			2049.767			1155.7			1310.04			1182.836			864.117			1456.339			2383.356					
F (Prob)	0.167			0.254			0.001			0.001			0.004			0			0.002			0					
CV %	15			17			10			9			18.6			5			10			11					

## 16<sup>th</sup> SAWYT

### **Performance of wheat genotypes under semi-arid conditions in Afghanistan**

This study was conducted using a set of 40 wheat genotypes included in CIMMYT's 16<sup>th</sup> Semi-Arid Wheat Yield Trial (16<sup>th</sup> SAWYT) and a local commercial cultivar, based on farmers' preference. These wheat genotypes represent diverse genetic backgrounds and a large number of them resulted from crosses involving parents with high yield, wide adaptation under semi-arid wheat growing conditions and resistance to biotic and abiotic stresses (Table 13). The wheat genotypes were tested at one site (Herat) representing semi-arid wheat growing environments in Afghanistan.

The study was conducted during the wheat-growing season (Nov. to June) in 2008-2009 using a randomized complete block design with genotypes arranged in alpha lattice combination in two replications. The trials were sown in a timely fashion using the standard seeding rate (105 kg/ha). Individual experimental plots of 6.0 m<sup>2</sup> were seeded as six rows with 0.20-m row spacing. Fertilizers were mixed into the soil prior to seeding using recommended dose (120 kg N, and 60 kg P<sub>2</sub>O<sub>5</sub> per hectare). The experimental plots were irrigated four times and hand weeded as necessary.

Days to heading was recorded when spikes of approximately 50% of the plants in a plot were fully emerged. At maturity, plant height in each plot was measured from ground level to the tip of the spikes. Days to maturity were recorded when glumes completely lost their green color. Agronomic score of the genotypes at maturity was recorded using a scale of 1 to 5 with 5 representing the best agronomic traits based on the criteria circulated in CIMMYT's wheat trial field books. Plants were hand-harvested at the ground level from the middle 3.6 m<sup>2</sup> in each plot. After threshing, grain weight and kernel color were recorded.

Analysis of variance for grain yield at Herat was conducted to determine significance of genotypic differences. Also, the experimental genotypes were compared with the local check for grain yield and other traits.



## **Results and discussion**

Grain yield of the 40 genotypes ranged from 8159 to 4462 with mean yield of 6825 Kg/ha (Table 13). Many genotypes in this trial are potential varieties and produced grain yield more than Ghorī 96, the check in this study, nine entries performed better growth in dry condition of the tested area.

### **Conclusion:**

Based on yield, agronomic performance, and adaptation the following entries were advanced for further testing in advanced national yield trials:

310, 314, 317, 318, 323, 332, 333, 334, 340= 9

**Table 13: Mean values for yield and other traits of the wheat genotypes tested in the 16<sup>th</sup> SAWYT in 2008-2009 at Herat, Afghanistan**

Entry No.	Variety Name/Pedigree	Grain Yield			Days to		Plant Height (cm)	Agronomic score	Check Mark
		Kg/ha	Rank	% of Check	Heading	Maturity			
301	LOCAL CHECK	5896	36	100	103	156	156	3	**
302	BERKUT	7552	5	128	105	154	154	5	***
303	CHAM 6	7262	11	123	103	155	155	.	
304	KLEIN CHAMACO	5616	39	95	102	152	152	3	**
305	CHAKWAL 86	7267	10	123	104	152	152	5	***
306	DHARWAR DRY	4462	40	76	105	157	157	5	***
307	VOROBAY	6686	26	113	105	156	156	.	
308	TOB/ERA//TOB/CNO67/3/PLO/4/VEE#5/5/KAUZ/6/PRL/SARA//TSI/VEE#5	6358	32	108	104	154	154	5	***+
309	TOB/ERA//TOB/CNO67/3/PLO/4/VEE#5/5/KAUZ/6/FRET2	6718	25	114	104	154	154	5	***
310	TOB/ERA//TOB/CNO67/3/PLO/4/VEE#5/5/KAUZ/6/FRET2	7262	12	123	105	155	155	5	***
311	PASTOR/WBLL1	6192	34	105	105	152	152	5	***
312	PASTOR/3/KAUZ*2/OPATA//KAUZ/4/CHEN/AE.SQ//2*OPATA	6971	18	118	104	152	152	5	***
313	PASTOR/3/KAUZ*2/OPATA//KAUZ/4/CHEN/AE.SQ//2*OPATA	7226	13	123	103	152	152	5	***
314	FRAME//MILAN/KAUZ/3/PASTOR	7300	8	124	104	157	157	5	***
315	CROC_1/AE.SQUARROSA (205)//BORL95/3/PRL/SARA//TSI/VEE#5/4/FRET2	7045	16	119	104	156	156	3	**
316	SHARP/3/PRL/SARA//TSI/VEE#5/5/VEE/LIRA//BOW/3/BCN/4/KAUZ	6208	33	105	104	155	155	5	***
317	SHARP/3/PRL/SARA//TSI/VEE#5/5/VEE/LIRA//BOW/3/BCN/4/KAUZ	8058	2	137	104	155	155	5	***
318	PASTOR/3/URES/JUN//KAUZ/4/WBLL1	7901	3	134	103	156	156	5	***
319	1455/2*PASTOR	5895	37	100	102	156	156	5	***
320	CANADIAN/CUNNINGHAM//KENNEDY	6854	22	116	102	152	152	5	***
321	494J6.11//TRAP#1/BOW/3/PASTOR	6629	27	112	107	155	155	3	**
322	T.DICOCCON PI94625/AE.SQUARROSA (372)//3*PASTOR	7225	14	123	107	153	153	3	**
323	PRL/SARA//TSI/VEE#5/3/WBLL1	7311	7	124	104	149	149	5	***
324	CHIR3/4/SIREN//ALTAR 84/AE.SQUARROSA (205)/3/3*BUC/5/PFAU/WEAVER	6868	21	116	103	150	150	5	***
325	CHIR3/4/SIREN//ALTAR 84/AE.SQUARROSA (205)/3/3*BUC/5/PFAU/WEAVER	6103	35	104	103	152	152	5	***
326	KA/NAC//SERI/RAYON	6592	28	112	102	150	150	5	***
327	KA/NAC//SERI/RAYON	7114	15	121	103	152	150	5	***
328	WBLL1/6/TZPP*2/ANE//INIA/3/CNO67/JAR//KVZ/4/MN72252/5/SHI#4414/CROW	6365	31	108	102	150	150	2	*
329	BRBT2/METSO	6528	30	111	103	150	150	3	**
330	BETTY/3/CHEN/AE.SQ//2*OPATA	6986	17	118	102	152	152	3	**
331	HXL7573/2*BAU//WBLL1	6953	19	118	106	154	154	5	***
332	CROC_1/AE.SQUARROSA (224)//OPATA/3/PASTOR	8159	1	138	104	150	150	5	***
333	CROC_1/AE.SQUARROSA (224)//OPATA/3/PASTOR	7796	4	132	103	154	154	3	***

334	1447/PASTOR//KRICHAUFF	7293	9	124	103	157	157	3	**
335	PASTOR/MILAN//MILAN/SHA7	6572	29	111	106	156	156	3	***
336	PF70402//ALD//PAT72160//ALD/3//PEW/4//PASTOR/5//CBRD//BAU	6839	23	116	104	152	152	3	**
337	SIRKKU//FINSI	6944	20	118	103	150	150	3	**
338	JARU//SHA4//CHIL	5844	38	99	101	148	148	3	**
339	JNRB.5//PIFED	6798	24	115	103	152	152	5	***
340	OASIS/5*//BORL95/5//CNDO/R143//ENTE//MEXI75/3//AE.SQ/4/2*//OCI	7363	6	125	103	152	152	5	***

Mean		6825			104	153	153	4	
Max		8159			107	157	157	5	
Min		4462			101	148	148	2	
EMS		165174				0.2			
LSD <sub>0.05</sub>		920.53				0.905			
F (Prob)		0				0			
CV %		6				0			

## 4<sup>th</sup> EBWYT

### Performance of Elite Bread Wheat Yield Trial

#### Materials and methods

This study was conducted at Shishambagh, Darulaman and Posi-e-shan research stations using a set of 30 wheat genotypes included in CIMMYT's 4<sup>th</sup> Elite Bread Wheat Yield Trial (4<sup>th</sup> EBWYT) and a commercial cultivar which changed at three sites based on farmers' preference. These wheat genotypes represent diverse genetic backgrounds and a large number of them resulted from crosses involving parents with high yield, wide adaptation and resistance to biotic and abiotic stresses (Table 14). The wheat genotypes were tested at three sites (Nangarhar, Kabul and Baghlan) in Afghanistan.

The study was conducted during the wheat-growing season (Nov. to June) in 2008-2009 using a randomized complete block design with genotypes arranged in alpha lattice combination in three replications. The trials were sown in a timely fashion using the standard seeding rate (105 kg/ha). Individual experimental plots of 6.0 m<sup>2</sup> were seeded as six rows with 0.20-m row spacing. Fertilizers were mixed into the soil prior to seeding using recommended dose. The experimental plots were hand weeded as necessary at individual sites. The other trial management practices were consistent with good crop husbandry recommended in the region.

Days to heading was recorded when spikes of approximately 50% of the plants in a plot were fully emerged. At maturity, plant height in each plot was measured from ground level to the tip of the spikes. Agronomic score of the genotypes at maturity was recorded using a scale of 1 to 5 with 5 representing the best agronomic traits based on the criteria circulated in CIMMYT's wheat trial field books. Plants were hand-harvested at the ground level from the middle 3.6 m<sup>2</sup> in each plot. After threshing, grain weight and kernel color were recorded.

Analysis of variance for grain yield at the three sites was conducted to determine significance of genotypic differences. Also, the experimental genotypes were compared with the local check for grain yield and other traits.

## Results and discussion

The mean yield of 29 wheat genotypes tested at three locations in 2009 is summarized in Table 18a. The highest yield of 5516 Kg/ha across sites was recorded for Entry # 508 and lowest yield of 4221 Kg/ha was obtained by Entry # 523 while different checks used at different locations viz., Ariana 07 at Kabul, Solh 02 at Nangarhar and Mazar 99 at Baghlan yielded 3907, 4364 and 4837 Kg/ha respectively meaning that most of the genotypes performed better than the checks tested in this trial.

Yellow rust incidence was serious at Kabul and Nangarhar whereas no infection was observed in Baghlan Province. Most of the genotypes were susceptible to yellow rust with different extent of reaction and severity as shown in Table 18b. From among the genotypes studied in this experiment, 10 lines were resistant to yellow rust at Kabul. It seems that there were no significant differences among the yield of entries # 503, 504, 506, 508, 509, 510, 511, 512, 521, 524, 528, 529 and 530, however entry 511 with the mean yield of 5450 Kg/ha, Entry # 503 with the mean yield of 5155, Entry # 508 with mean yield of 5108, entry # 509 by producing 4919, entry # 525 by producing 4898, Entry # 529 by producing 4886 and 512 by producing 4842 gave high yield and were ranked 1, 2, 3, 4, 5, 6, and 7 respectively. The local check (Ariana 07) yielded 3907 Kg/ha. Compared to local check the above mentioned genotypes produced 39%, 32%, 31%, 26%, 25%, 25% and 24% higher yield. Considering the rust resistance of these varieties, entry # 509 and entry # 528 scored 20 MS and 30 MS and were rejected. Grain yield analysis of 29 genotypes tested in Nangarhar and Baghlan indicated that there were no significant differences among the genotypes at both sites and most of the exotic genotypes had higher potential than the local check, viz., Solh 02 in Nangarhar and Mazar 99 at Baghlan.

In Nangarhar the mean yield ranged from 4141 Kg/ha to 6453 Kg/ha with an over all mean 5292 Kg/ha. Based on grain yield performance Entry # 502, 503, 504, 507, 508, 513, 514, 515, 516, 517, 519, 520, 522, 527, 528, 529 and 530 produced higher yields. Considering the rust reaction Entry # 502, 509, 514, 516, 517, 527 and 528 were susceptible to yellow rust and were scored 20 MS to 80 S and these were rejected. Genotypes' mean ranged from 4188 Kg/ha to 5970 Kg/ha with over all mean of 5134 Kg/ha in Baghlan. Analysis of variance for grain yield indicated that there were no significant differences among the genotypes. Most of the exotic lines had higher potential

compared to check Mazar 99. Entry # 508, 517, 507, 502, 526, 519, 514, 529, 518 and 512 yielded higher than others in this study. There was no rust observed in Baghlan, so the above mentioned entries were selected for further testing.

**Conclusion:**

Analysis for grain yield revealed that there were significant differences among the genotypes only at Kabul. Most of these exotic lines had high potential and produced more yield than local improved varieties *viz.*, Ariana 07, Solh 02 and Mazar 99 which were used as check at Darulaman, Shishambagh and Posi-e-shan research stations respectively. Based on across sites grain yield performance of genotypes, resistance to rust diseases and agronomic traits the entry # 503, 507, 508, 511, 512, 529 and 530 were advanced for further testing in different advance and National Uniform Trials in 2008/2009.

Table 14: Cross Name and origin name of 4<sup>th</sup> EBWYT 2008 and 2009.

Cross Name	Selection History	Origin
LOCAL CHECK		
WAXWING*2/KIRITATI	CGSS01B00054T-099Y-099M-099M-099Y-099M-13Y-0B	BV2008\C4THEBWYT\63
KIRITATI/4/2*SERI.IB*2/3/KAUZ*2/BOW//KAUZ	CGSS02B00120T-099B-099Y-099M-099Y-099M-18WGY-0B	BV2008\C4THEBWYT\58
SERI/RAYON*2//PFAU/WEAVER	CGSS04Y00001T-099M-099Y-099ZTM-099Y-099M-2WGY-0B	BV2008\C4THEBWYT\1
SAAR/2*WAXWING	CGSS04Y00040T-099M-099Y-099M-099Y-099M-4WGY-0B	BV2008\C4THEBWYT\5
SERI.IB*2/3/KAUZ*2/BOW//KAUZ*2/5/CNO79//PF70354/MUS/3/PASTOR/4/BAV92	CGSS04Y00058T-099M-099Y-099M-099Y-099M-11WGY-0B	BV2008\C4THEBWYT\7
PBW343*2/KUKUNA/3/PASTOR//CHIL/PRL/4/PBW343*2/KUKUNA	CGSS04Y00060T-099M-099Y-099M-099Y-099M-11WGY-0B	BV2008\C4THEBWYT\8
WHEAR//INQALAB 91*2/TUKURU	CGSS04Y00076S-099Y-099M-099Y-099M-5WGY-0B	BV2008\C4THEBWYT\9
PBW343*2/KUKUNA//PBW343*2/KUKUNA	CGSS04Y00099S-099Y-099M-099Y-099M-10WGY-0B	BV2008\C4THEBWYT\10
PBW343*2/KUKUNA//PBW343*2/KUKUNA	CGSS04Y00099S-099Y-099M-099Y-099M-18WGY-0B	BV2008\C4THEBWYT\11
PBW343*2/KUKUNA//PBW343*2/KUKUNA	CGSS04Y00099S-099Y-099M-099Y-099M-20WGY-0B	BV2008\C4THEBWYT\12
CNDOR/143//ENTE/MEXI_2/3/AEGILOPS SQUARROSA (TAUS)/4/WEAVER/5/2*PASTOR/6/SKAUZ/PARUS//PARUS	CMSS04Y00421S-099Y-099ZTM-099Y-099M-4WGY-0B	BV2008\C4THEBWYT\17
MINO/898.97	CMSS04Y00921S-099Y-099ZTM-099Y-099M-2WGY-0B	BV2008\C4THEBWYT\22
KIRITATI//SERI/RAYON	CGSS02Y00152S-099M-099Y-099M-11WGY-0B	BV2008\C4THEBWYT\23
WBL1*2/BRAMBLING	CGSS01B00062T-099Y-099M-099M-099Y-099M-34WGY-0B	BV2008\C4THEBWYT\24
WBL1*2/KIRITATI	CGSS01B00063T-099Y-099M-099M-099Y-099M-3WGY-0B	BV2008\C4THEBWYT\25
WBL1*2/KIRITATI	CGSS01B00063T-099Y-099M-099M-099Y-099M-18WGY-0B	BV2008\C4THEBWYT\26
WBL1*2/KIRITATI	CGSS01B00063T-099Y-099M-099M-099Y-099M-31WGY-0B	BV2008\C4THEBWYT\27
PRL/2*PASTOR//PBW343*2/KUKUNA	CMSS04Y00086S-0Y-099ZTM-099Y-099M-4WGY-0B	BV2008\C4THEBWYT\29
PBW343/HUITES/4/YAR/AE.SQUARROSA (783) //MILAN/3/BAV92	CMSS04M00348S-0Y-099ZTM-099Y-099M-10WGY-0B	BV2008\C4THEBWYT\37
KAUZ//ALTAR 84/AOS/3/PASTOR/4/MILAN/CUPE//SW89.3064/5/KIRITATI	CMSS04M01386S-0TOPY-099ZTM-099Y-099M-2WGY-0B	BV2008\C4THEBWYT\39
SW89.5277/BORL95//SKAUZ/3/PRL/2*PASTOR/4/HEILO	CMSS04M01483S-0TOPY-099ZTM-099Y-099M-1WGY-0B	BV2008\C4THEBWYT\41
SERI.IB*2/3/KAUZ*2/BOW//KAUZ/4/PBW343*2/TUKURU /S/C80.1/3*BATAVIA//2*WBL1	CGSS04B00018T-099Y-099ZTM-099Y-099M-10WGY-0B	BV2008\C4THEBWYT\43
PFAU/SERI.IB//AMAD*2/3/PBW343*2/KUKUNA	CGSS04B00021T-099Y-099ZTM-099Y-099M-15WGY-0B	BV2008\C4THEBWYT\44
PFAU/SERI.IB//AMAD*2/3/PBW343*2/KUKUNA	CGSS04B00021T-099Y-099ZTM-099Y-099M-22WGY-0B	BV2008\C4THEBWYT\45
PRL/2*PASTOR//PBW343*2/KUKUNA/3/TACUPETO F2001*2/KUKUNA	CGSS04B00025T-099Y-099ZTM-099Y-099M-3WGY-0B	BV2008\C4THEBWYT\46
WAXWING*2//PBW343*2/KUKUNA	CGSS04B00027T-099Y-099ZTM-099Y-099M-3WGY-0B	BV2008\C4THEBWYT\48
HUW234+LR34/PRINIA//PBW343*2/KUKUNA/3/TACUPETO F2001*2/KUKUNA	CGSS04B00033T-099Y-099ZTM-099Y-099M-11WGY-0B	BV2008\C4THEBWYT\49
WHEAR/SOKOLL	CMSS04Y00201S-099Y-099ZTM-099Y-099M-11WGY-0B	BV2008\C4THEBWYT\52
WHEAR//2*PRL/2*PASTOR	CGSS03B00090T-099Y-099M-099Y-099M-6WGY-0B-1B	BV2008\C4THEBWYT\56

Table 15: Performance of wheat genotypes in 4th EBWYT at Kabul, Afghanistan in 2008-2009

Entry. No.	Variety Name/pedigree	Grain Yield			Days to Heading	Plant Height (cm)	Test Weight	Agronomic Score	1000 G/W	Yellow Rust	Field Selection
		Kg/ha	Rank	% of Check							
501	LOCAL CHECK (Ariana-07)	3907	18	Check	141	77	3.91	4	40	0	
502	WAXWING*2/KIRITATI	3160	27	81	139	77	3.16	3	42	80 S	
503	KIRITATI/4/2*SERI.IB*2/3/KAUZ*2/BOW//KAUZ	5155	2	132	140	78	5.16	4	44	0	
504	SERI/RAYON*2//PFAU/WEAVER	4011	14	103	138	83	4.01	4	34	80 S	
505	SAAR/2*WAXWING	3573	22	91	134	77	3.57	4	36	80S	
506	SERI.IB*2/3/KAUZ*2/BOW//KAUZ*2/5/CNO79//PF70354/MUS/3/ PASTOR/4/BAV92	4112	13	105	137	82	1107	3	40	20MR	
507	PBW343*2/KUKUNA/3/PASTOR//CHIL/PRL/4/PBW343*2/KUKUNA	4000	15	102	134	72	4.00	4	43	0	
508	WHEAR//INQALAB 91*2/TUKURU	5108	3	131	137	90	5.11	4	44	10MR	
509	PBW343*2/KUKUNA//PBW343*2/KUKUNA	4919	4	126	134	82	4.92	4	44	5 R	
510	PBW343*2/KUKUNA//PBW343*2/KUKUNA	4172	12	107	135	87	4.17	4	40	40 MS	
511	PBW343*2/KUKUNA//PBW343*2/KUKUNA	5450	1	139	134	85	5.45	4	42	10 MS	
512	CNDO/R143//ENTE/MEXI 2/3/AEGILOPS SQUARROSA (TAUS)/4/ WEAVER/5/2*PASTOR/6/KAUZ/PARUS//PARUS	4842	7	124	138	83	4.84	4	42	60 MS	
513	MINO/898.97	2617	29	67	137	75	2.62	4	40	10 MR	
514	KIRITATI//SERI/RAYON	3939	17	101	136	77	3.94	3	40	40 S	
515	WBL1*2/BRAMBLING	3752	19	96	137	83	3.75	5	42	10 MR	
516	WBL1*2/KIRITATI	2788	28	71	133	77	2.79	3	44	80 S	
517	WBL1*2/KIRITATI	3547	24	91	134	82	3.65	3	40	100 S	
518	WBL1*2/KIRITATI	3244	26	83	134	77	3.24	4	39	60 S	
519	PRL/2*PASTOR//PBW343*2/KUKUNA	3744	20	96	133	77	3.74	4	45	80 S	
520	PBW343/HUITES/4/YAR/AE.SQUARROSA (783)//MILAN/3/BAV92	2054	30	53	136	65	2.05	4	40	40 MS	
521	KAUZ//ALTAR 84/AOS/3/PASTOR/4/MILAN/CAPE//SW89.3064/5/KIRITATI	4309	9	110	136	75	4.31	4	41	0	
522	SW89.5277/BORL95//SKAUZ/3/PRL/2*PASTOR/4/HEILO	3246	25	83	140	73	3.25	4	50	0	
523	SERI.IB*2/3/KAUZ*2/BOW//KAUZ/4/PBW343*2/TUKURU/5/C80.1/3 *BATAVIA//2*WBL1	3564	23	91	135	82	3.56	4	36	40 MR	
524	PFAU/SERI.IB//AMAD*2/3/PBW343*2/KUKUNA	4213	11	108	137	87	4.21	4	38	100 S	
525	PFAU/SERI.IB//AMAD*2/3/PBW343*2/KUKUNA	4896	5	125	137	80	4.90	3	40	TR	
526	PRL/2*PASTOR//PBW343*2/KUKUNA/3/TACUPETO F2001*2/KUKUNA	3983	16	102	139	83	3.98	4	40	10 MR	
527	WAXWING*2//PBW343*2/KUKUNA	3729	21	95	136	87	3.77	3	40	100 S	
528	HUW234+LR34/PRINIA//PBW343*2/KUKUNA/3/TACUPETO F2001*2/KUKUNA	4305	10	110	139	90	4.31	4	34	40 MS	
529	WHEAR/SOKOLL	4886	6	125	136	80	4.89	4	45	0	
530	WHEAR//2*PRL/2*PASTOR	4679	8	120	138	83	4.68	3	30	5 R	



Mean		3997			136	80	41				
Max		5450			141	90	1107				
Min		2054			133	65	2				
EMS		897253			0.440996	25.6801	121651				
LSD0.05		1581.781			1.109	8.463	582.481				
F (Prob)		0.008			0	0	0.486				
CV %		24			0	6	855				

Table 16: Performance of wheat genotypes in 4th EBWYT at Nangarhar, Afghanistan in 2008-2009 wheat seasons

Entry No.	Variety Name/Pedigree	Grain Yield			Days to Heading	Plant Height (cm)	Agronomic Score	Check Mark	Field Selection
		Kg/ha	Rank	% of Check					
501	LOCAL CHECK (Solh-02)	4364	29	Check	122	115	4		
502	WAXWING*2/KIRITATI	5377	16	123	112	105	3		
503	KIRITATI/4/2*SERI.1B*2/3/KAUZ*2/BOW//KAUZ	5415	14	124	116	110	5	*	
504	SERI/RAYON*2//PFAU/WEAVER	5378	15	123	109	110	3		
505	SAAR/2*WAXWING	5039	18	115	110	105	3		
506	SERI.1B*2/3/KAUZ*2/BOW//KAUZ*2/5/CNO79//PF70354/MUS/3/PASTOR/4/BAV92	4859	20	111	112	110	4		
507	PBW343*2/KUKUNA/3/PASTOR//CHIL/PRL/4/PBW343*2/KUKUNA	5560	10	127	107	105	5	*	
508	WHEAR//INQALAB 91*2/TUKURU	5470	13	125	109	110	4	*	
509	PBW343*2/KUKUNA//PBW343*2/KUKUNA	4456	28	102	107	100	4		
510	PBW343*2/KUKUNA//PBW343*2/KUKUNA	4812	23	110	108	105	3		
511	PBW343*2/KUKUNA//PBW343*2/KUKUNA	4822	22	110	107	100	4		
512	CNDO/R143//ENTE/MEXI 2/3/AEGILOPS SQUARROSA (TAUS)/4/ WEAVER/5/2*PASTOR/6/SKAUZ/PARUS//PARUS	4889	19	112	118	110	5	*	
513	MINO/898.97	5173	17	119	109	100	4	*	
514	KIRITATI//SERI/RAYON	5928	6	136	108	100	4		
515	WBLL1*2/BRAMBLING	6254	2	143	108	105	4	*	
516	WBLL1*2/KIRITATI	5847	7	134	107	105	5	*	
517	WBLL1*2/KIRITATI	6025	5	138	107	100	4	*	
518	WBLL1*2/KIRITATI	4827	21	111	107	105	5	*	
519	PRL/2*PASTOR//PBW343*2/KUKUNA	5533	11	127	107	90	4		
520	PBW343/HUITES/4/YAR/AE.SQUARROSA (783)//MILAN/3/BAV92	6453	1	148	111	110	4	*	
521	KAUZ//ALTAR 84/AOS/3/PASTOR/4/MILAN/CUPE//SW89.3064/5/KIRITATI	4790	24	110	109	100	3		
522	SW89.5277/BORL95//SKAUZ/3/PRL/2*PASTOR/4/HEILO	5818	8	133	109	110	4	*	
523	SERI.1B*2/3/KAUZ*2/BOW//KAUZ/4/PBW343*2/TUKURU/5/C80.1/3*BATAVIA/2*WBLL1	4654	27	107	108	110	4		
524	PFAU/SERI.1B//AMAD*2/3/PBW343*2/KUKUNA	4141	30	95	106	100	3		
525	PFAU/SERI.1B//AMAD*2/3/PBW343*2/KUKUNA	4769	25	109	108	105	4		
526	PRL/2*PASTOR//PBW343*2/KUKUNA/3/TACUPETO F2001*2/KUKUNA	4675	26	107	106	105	2		
527	WAXWING*2//PBW343*2/KUKUNA	6129	4	140	111	115	2		
528	HUW234+LR34/PRINIA//PBW343*2/KUKUNA/3/TACUPETO F2001*2/KUKUNA	5616	9	129	108	115	2		
529	WHEAR/SOKOLL	5519	12	126	106	95	4	*	
530	WHEAR//2*PRL/2*PASTOR	6159	3	141	108	95	4	*	

Mean		5292			109	105	4		
Max		6453			122	115	5		
Min		4141			106	90	2		
EMS		701743			3.551				
LSD0.05		1398.94			3.148				
F (Prob)		0.062			0				
CV %		15.8			1.7				

**Table 17: Performance of wheat genotypes in 4thEBWYT at Baghlan, Afghanistan in 2008-2009 wheat seasons**

Entry No.	Variety Name/Pedigree	Grain Yield			Days to Heading	Plant Height (cm)	Test Weight	Field Selection
		Kg/ha	Rank	% of Check				
501	LOCAL CHECK (Mazar-99)	4837	23	Check	103	98	4836	
502	WAXWING*2/KIRITATI	5540	4	115	104	96	5539	
503	KIRITATI/4/2*SERI.1B*2/3/KAUZ*2/BOW//KAUZ	4816	24	100	104	105	4816	
504	SERI/RAYON*2//PFAU/WEAVER	5056	17	105	101	102	5056	
505	SAAR/2*WAXWING	4760	27	98	101	104	4760	
506	SERI.1B*2/3/KAUZ*2/BOW//KAUZ*2/5/CNO79//PF70354/MUS/3/PASTOR/4/BAV92	5044	18	104	102	104	5044	
507	PBW343*2/KUKUNA/3/PASTOR//CHIL/PRL/4/PBW343*2/KUKUNA	5616	3	116	98	100	5615	
508	WHEAR//INQALAB 91*2/TUKURU	5970	1	123	100	112	5970	
509	PBW343*2/KUKUNA//PBW343*2/KUKUNA	4573	28	95	98	89	4573	
510	PBW343*2/KUKUNA//PBW343*2/KUKUNA	4972	20	103	99	102	4972	
511	PBW343*2/KUKUNA//PBW343*2/KUKUNA	4963	22	103	98	93	4962	
512	CNDO/R143//ENTE/MEXI_2/3/AEGILOPS SQUARROSA (TAUS)/4/ WEAVER/5/2*PASTOR/6/SKAUZ/PARUS//PARUS	5417	10	112	103	109	5416	
513	MINO/898.97	5222	14	108	101	104	5222	
514	KIRITATI//SERI/RAYON	5467	7	113	100	96	5466	
515	WBL1*2/BRAMBLING	5090	15	105	100	106	5090	
516	WBL1*2/KIRITATI	5295	12	109	98	94	5295	
517	WBL1*2/KIRITATI	5630	2	116	98	111	5630	
518	WBL1*2/KIRITATI	5428	9	112	99	108	5428	
519	PRL/2*PASTOR//PBW343*2/KUKUNA	5479	6	113	98	95	5479	
520	PBW343/HUITES/4/YAR/AE.SQUARROSA (783)/MILAN/3/BAV92	5406	11	112	101	98	5406	
521	KAUZ//ALTAR 84/AOS/3/PASTOR/4/MILAN/CUPE//SW89.3064/5/KIRITATI	4964	21	103	102	92	4963	
522	SW89.5277/BORL95//SKAUZ/3/PRL/2*PASTOR/4/HEILO	4790	25	99	103	102	4789	
523	SERI.1B*2/3/KAUZ*2/BOW//KAUZ/4/PBW343*2/TUKURU/5/ C80.1/3*BATAVIA/2*WBL1	4445	29	92	101	108	4445	
524	PFAU/SERI.1B//AMAD*2/3/PBW343*2/KUKUNA	4980	19	103	100	101	4980	
525	PFAU/SERI.1B//AMAD*2/3/PBW343*2/KUKUNA	4188	30	87	102	101	4187	
526	PRL/2*PASTOR//PBW343*2/KUKUNA/3/TACUPETO F2001*2/KUKUNA	5518	5	114	102	118	5518	
527	WAXWING*2//PBW343*2/KUKUNA	5073	16	105	102	103	5073	
528	HUW234+LR34/PRINIA//PBW343*2/KUKUNA/3/TACUPETO F2001*2/KUKUNA	4783	26	99	102	107	4783	
529	WHEAR/SOKOLL	5449	8	113	100	112	5449	
530	WHEAR/2*PRL/2*PASTOR	5246	13	108	103	96	5246	

Mean		5134			101	102	5134	
Max		5970			104	118	5970	
Min		4188			98	89	4187	
EMS		457221			0.919	33.899	457227	
LSD0.05		1129.171			1.601	9.723	1129.171	
F (Probe)		0.461			0	0	0.461	
CV %		13.2			1.0	5.7	13.2	



Mean		3997			5292			5134			4807		
Max		5450			6453			5970			5951		
Min		2054			4141			4188			3461		
EMS		897253			701743			457221					
LSD0.05		1581.781			1398.94			1129.171					
F (Prob)		0.008			0.062			0.461					
CV %		24			15.8			13.2					

**Table 18b: Yellow rust score of 4<sup>th</sup> EBWYT in 2009**

Entry No	Shishambagh (Nangarhar)		Posi-e-shan (Baghlan)		DA (Kabul)	
	Y R	Selected	YR	Selected	YR	Selected
1	0				0	
2	40 MS				30 MRS	
3	0	*		*	0	*
4	80 S				20 MS	
5	5 R				40 MSS	
6	0	*		*	5 S	
7	0	*		*	0	*
8	0	*		*	0	*
9	0				0 LPM	
10	0	*			10 MR	*
11	0			*	10 MR	*
12	0	*		*	0	*
13	0			*	10 MS	*
14	60 S				20 SMS	
15	0	**			5 R	*
16	20 MS				50 S	
17	40 MS			*	60 S	
18	0				40 S	
19	0				40 S	
20	0	*			20 SMS	
21	10 MR				0	*
22	5 MR				0	*
23	0			*	TR	*
24	100 S				70 S	
25	40 MS				TR	
26	0				TR	***
27	60 S				70 S	
28	20 MS				30MS	
29	TR	*			0	*
30	0				0	*



## 12<sup>th</sup> IWWYT-IRR, 08/09

### Performance of International winter wheat genotypes in cold environmental area

#### Materials and methods

This study was conducted at Faculty of Agriculture Farm of Kabul and Mullah-Ghulam Research Station, Bamyán using a set of 19 wheat genotypes included in CIMMYT's 12<sup>th</sup> international winter wheat yield trial (12<sup>th</sup> IWWYT-IRR) and Solh 02 local commercial cultivar (Check). These wheat genotypes represent diverse genetic backgrounds and a large number of them resulted from crosses involving parents with high yield, wide adaptation in cold area and resistance to biotic and abiotic stresses.

The study was conducted during the wheat-growing season (Oct. to Aug) in 2008-2009 these trials were planted under irrigated condition at both sites using a randomized complete block design with genotypes arranged in alpha lattice combination in two replications. The trial was sown in a timely fashion using the standard seeding rate (105 kg/ha). Individual experimental plots of 7.20 m<sup>2</sup> were seeded as six rows with 0.20-m row spacing. Fertilizer was mixed into the soil prior to seeding as CIMMYT recommended. The experimental plots were hand-weeded as necessary at individual sites. The other trial management practices were consistent with good crop husbandry recommended in the region.

Days to heading was recorded when spikes of approximately 50% of the plants in a plot were fully emerged. At maturity, plant height in each plot was measured from ground level to the tip of the spikes. Plants were hand-harvested at the ground level from the middle 4 m<sup>2</sup> in each plot. After threshing, grain weight and color were recorded.

Analysis of variance was conducted to determine the significance of genotypic differences for grain yield. The experimental genotypes were also compared with the local check to determine their relative performance (Tables 19, 20).

#### Results and discussion

Across mean of grain yield of 19 genotypes in 12<sup>th</sup> IWWYT –IR ranged from 4701 to 8910 Kg/ha with overall mean of 6685 Kg/ha in two locations. Average grain yield of the genotypes by sites ranged from 5852 to 11606 Kg/ ha and 2784 to 6646 Kg/ha in Kabul

and Bamyan respectively. The mean of genotypes in Kabul at 8846 Kg/ha was much higher than mean of genotypes 4525 Kg/ha in Bamyan. Entry # 6,7,12, 13 and 19 were high yielding varieties in Kabul, whereas entry # 9, 11, 12, 13, 15, 16, 17, 18 and 20 were higher yielding in Bamyan province.

**Conclusion:**

Based on grain yield, resistant to rust, grain color and wide adaptation entry # 8, 12, 13, 14, 18, 19 and 20 were advanced for further testing to confirm their performance and stability.

Table19: Mean values for yield and other traits of the wheat genotypes tested in the 12<sup>th</sup> IWWYT-IRR in 2008-2009 at Kabul FA, Afghanistan

Entry No.	Variety	Grain Yield			Days to Heading	Plant Height (cm)	% Stand	1000 GWT	Yellow Rust	Color	Field Selection
	Name/Pedigree	kg/ha	Rank	% of Check							
1	BEZOSTAYA	7528	17	77	139	116	91	48	5R	DR	
2	KINACI	9093	9	92	138	96	91	44	TR*	LR	
3	KATIA	8320	14	85	138	101	90	42	40MS	DR	
4	KONYA	8546	10	87	141	98	90	50	40MS	DR	
5	SOLH-02	9833	6	Check	140	100	92	44	10R	A	
6	Mv17//Attila/Bcn	11143	3	113	135	105	91	52	10MR	DR	
7	YORONA/HD2402//ALBATROSS ODESSKIY	10549	4	107	133	103	92	42	0L	DR	
8	MOTAH/BOUHOUTH6	7706	16	78	139	90	92	40	20MS	W	
9	ATTILA/3/AGRI/NAC//MLT	6691	19	68	131	98	92	30	80S	A	
10	ATTILA/3/AGRI/NAC//MLT	5852	20	60	133	97	94	32	80S	A	
11	ZANDER-10//BOW/NKT	8366	13	85	139	94	91	44	0	DR	
12	TX69A509.2//BBY/FOX/3/GRK//NO64/PEX/4/CER/5/CHIL/2*STAR	11606	1	118	136	91	91	48	5R	R	
13	TX69A509.2//BBY/FOX/3/GRK//NO64/PEX/4/CER/5/CHIL/2*STAR	11174	2	114	138	93	89	50	5R*	R	
14	PYN/BAU//F6038W12-1	9250	8	94	135	93	91	40	40MS	A	
15	AGRI/BJY//VEE/3/BUL6687.12	6794	18	69	139	95	88	40	80S	DR	
16	UNUMLI BUGDAY/3/AGRI/BJY//VEE/4/AGRI/BJY//VEE	8395	12	85	132	106	92	44	60S	A	
17	338-K1-1//ANB/BUC/3/KIRGIZ	8472	11	86	140	93	89	46	0seg	DR	
18	TAST/SPRW//ZAR/5/YUANDONG 3/4/PPB8-68/CHRC/3/PYN//TAM101/AMIGO	9299	7	95	141	98	92	42	10R	A	
19	TAST/SPRW//ZAR/5/YUANDONG 3/4/PPB8-68/CHRC/3/PYN//TAM101/AMIGO	10127	5	103	143	91	93	40	10R	DR	
20	CO724377/NAC//SERI/3/ERYTHROSPERMUM5678/87	8168	15	83	138	97	92	40	80S	R	
Mean		8846			137	98	91				
Max		11606			143	116	94				
Min		5852			131	90	88				
EMS		630187			12.1368	8.64095	4.52353				
LSD <sub>0.05</sub>		1663.326			7.292	6.744	4.676				
F (Prob)		0			0.118	0	0.684				
CV %		9			3	3	2				

**Table 20: Mean values for yield and other traits of the wheat genotypes tested in the 12<sup>th</sup> IWWYT-IRR in 2008-2009 at Bamyan, Afghanistan**

Entry No.	Variety Name/Pedigree	Grain Yield			Days to Heading	Plant Height(cm)	Yellow Rust	Field Selection
		kg/ha	Rank	% of Check				
1	BEZOSTAYA	3835	14	109	161	95	0	
2	KINACI	3558	15	101	162	95	0	
3	KATIA	5034	7	143	161	94	0	
4	KONYA	2784	20	79	160	81	0	
5	LOCAL CHECK ( Solh 02)	3530	17	Check	163	88	0	
6	Mv 17 //Attila/Bcn	3105	19	88	163	90	0	
7	VORONA/HD2402//ALBATROSSODESSKIY	3328	18	94	159	79	60s	
8	MOTAH/BOUHOUTH6	4429	11	125	163	81	0	
9	ATTILA/3AGRI/NAC//MLT	4828	9	137	164	80	0	
10	ATTILA/3AGRI/NAC//MLT	3550	16	101	161	82	5R	
11	ZANDER-10//BOW/NKT	6447	2	183	160	81	0	
12	TX69A509.2//BBY/FOX/3GRK//NO64/PEX/4CER/5/CHIL/2*STAR	5670	3	161	161	83	0	
13	TX69A509.2//BBY/FOX/3GRK//NO64/PEX/4CER/5/CHIL/2*STAR	6646	1	188	163	94	0	
14	PYN/BAU//F6038W12-1	4391	12	124	163	75	0	
15	AGRI/BJYIN/NEE/3/BUL6687.12	4641	10	131	159	72	0	
16	UNUMLIBUGDAY/3/AGRI/BJY/NEE/4/AGRI/BJY/NEE	4996	8	142	162	85	20 MR	
17	338-K1-1//ANB/BUC/3KIRGIZ	5594	4	158	163	76	0	
18	TAST/SPRW//ZAR/5YUANDONG3/4/PPB868/CHRC/3/PYN//TAM101/AMIGO	5070	5	144	164	85	0	
19	TAST/SPRW//ZAR/5YUANDONG3/4/PPB868/CHRC/3/PYN//TAM101/AMIGO	3996	13	113	159	80	0	
20	CO724377/NAC//SERI/3/ERYTHROSPERMUM5678/87	5066	6	144	162	76	0	
Mean		4525			162	84		
Max		6646			164	95		
Min		2784			159	72		
EMS		741619			6.29	27.98		
LSD <sub>0.05</sub>		2036.72			5.98	12.58		
F (Prob)		0.037			0.665	0.025		
CV %		19			2	6		

Table21: Across Mean of 12th IWWYT-IRR in two locations 2008-2009

Variety		Grain Yield Kabul-FA			Grain Yield Bamyar			Across Mean		
Entry No.	Name/Pedigree	kg/ha	Rank	% of Check	kg/ha	Rank	% of Check	Kg/ha	Rank	% of Check
1	BEZOSTAYA	7528	17	77	3835	14	109	5681	18	85
2	KINACI	9093	9	92	3558	15	101	6326	14	95
3	KATIA	8320	14	85	5034	7	143	6677	12	100
4	KONYA	8546	10	87	2784	20	79	5665	19	85
5	SOLH-02	9833	6	Check	3530	17	Check	6681	11	Check
6	Mv17//Attila/Bcn	11143	3	113	3105	19	88	7124	5	107
7	VORONA/HD2402//ALBATROSS ODESSKIY	10549	4	107	3328	18	94	6939	8	104
8	MOTAH/BOUHOUTH6	7706	16	78	4429	11	125	6068	15	91
9	ATTILA/3/AGRI/NAC//MLT	6691	19	68	4828	9	137	5760	16	86
10	ATTILA/3/AGRI/NAC//MLT	5852	20	60	3550	16	101	4701	20	70
11	ZANDER-10//BOW/NKT	8366	13	85	6447	2	183	7406	3	111
12	TX69A509.2//BBY/FOX/3/GRK//NO64/PEX/4/CER/5/CHIL/2*STAR	11606	1	118	5670	3	161	8638	2	129
13	TX69A509.2//BBY/FOX/3/GRK//NO64/PEX/4/CER/5/CHIL/2*STAR	11174	2	114	6646	1	188	8910	1	133
14	PYN/BAU//F6038W12-1	9250	8	94	4391	12	124	6820	9	102
15	AGRI/BJY//VEE/3/BUL6687.12	6794	18	69	4641	10	131	5717	17	86
16	UNUMLI BUGDAY/3/AGRI/BJY//VEE/4/AGRI/BJY//VEE	8395	12	85	4996	8	142	6695	10	100
17	338-K1-1//ANB/BUC/3/KIRGIZ	8472	11	86	5594	4	158	7033	7	105
18	TAST/SPRW//ZAR/5/YUANDONG 3/4/PPB8-68/CHRC/3/PYN//TAM101/AMIGO	9299	7	95	5070	5	144	7185	4	108
19	TAST/SPRW//ZAR/5/YUANDONG 3/4/PPB8-68/CHRC/3/PYN//TAM101/AMIGO	10127	5	103	3996	13	113	7062	6	106
20	CO724377/NAC//SERI/3/ERYTHROSPERMUM5678/87	8168	15	83	5066	6	144	6617	13	99
Mean		8846			4525			6685		
Max		11606			6646			8910		
Min		5852			2784			4701		
EMS		630187			741619					
LSD0.05		1663.326			2036.72					
F (Prob)		0			0.037					
CV %		9			19					

## 11<sup>th</sup> IWWYT-SA, 08/09

### Performance of International winter wheat genotypes in cold environmental area

#### Materials and methods

This study was conducted at Urdu Khan Research Station Herat and Bagh-e-Zakhira Research Station Takhar. The study used a set of 19 wheat genotypes included in CIMMYT's 11<sup>th</sup> international winter wheat trial for semi arid condition (11<sup>th</sup> IWWYT-SA) and local commercial cultivar (check). These wheat genotypes represent diverse genetic backgrounds and a large number of them resulted from crosses involving parents with high yield, wide adaptation in cold area and resistance to biotic and abiotic stresses.

The study was conducted during the wheat-growing season (Oct. to Aug) in 2008-2009. These trials were planted under water stress condition using a randomized complete block design with genotypes arranged in alpha lattice combination in two replications. The trial was sown in a timely fashion using the standard seeding rate (105 kg/ha). Individual experimental plots of 7.20 m<sup>2</sup> were seeded as six rows with 0.20-m row spacing. Fertilizer was mixed into the soil prior to seeding as CIMMYT recommended. The experimental plots were hand-weeded as necessary at individual sites. The other trial management practices were consistent with good crop husbandry recommended in the region.

Days to heading was recorded when spikes of approximately 50% of the plants in a plot were fully emerged. At maturity, plant height in each plot was measured from ground level to the tip of the spikes. Plants were hand-harvested at the ground level from the middle 4 m<sup>2</sup> in each plot. After threshing, grain weight and color were recorded.

Analysis of variance was conducted to determine the significance of genotypic differences for grain yield. The experimental genotypes were also compared with the local check to determine their relative performance (Table, 22, 23).

#### Results and discussion

Across site mean yield of 19 genotypes in 11<sup>th</sup> IWWYT-SA ranged from 3943 to 7109 with an overall mean 5600 Kg/ha. At Takhar, average yield of the genotypes ranged from 3992 to 9621 and from 3657 to 5691 Kg/ha at Herat. The average mean in Takhar was higher than mean yield of genotypes in Herat. This was probably caused by prolonged rainy days in Takhar. Analysis of variance indicated variation among the genotypes in Takhar but not in Herat. Seven lines in Takhar and 19 lines in Herat produced higher

yield than commercial cultivars (Lalmi-2, Ghorl-96). Yield analysis revealed entry # 9, 11,17, 18, in Takhar and entry # 6,7, 8, 9, 11, 12, 13,14, 16, 17 and 19 at Heart produced higher yield compared to other genotypes included in this experiment (Table, 22, 23).

**Conclusion:**

Based on grain yield, resistance to yellow rust and grain color, the suitable entries # 9, 11, 17, 18, 19 and 14 were advanced for further evaluation in 2009/2010 (Table, 24).

**Table22: Mean values for yield and other traits of the wheat genotypes tested in the 11<sup>th</sup> IWWYT-SA in 2008-2009 at Takhar, Afghanistan**

Entry No.	Variety Name/Pedigree	Grain Yield			Days to		Plant Height (cm)	Yellow Rust	LR	Lodging
		Kg/ha	Rank	% of Check	Heading	Maturity				
1	GEREK79	4599	19	61	108	154	109	50 S	20 S	80%
2	ALTAY2000	7301	8	97	108	156	109	80 S	40 S	50%
3	KARAHAN	3992	20	53	108	157	116	0	30 S	90%
4	BAYRAKTAR	5722	14	76	106	155	110	0	0	40%
5	LOCAL CHECK(Lalmi 2)	7497	7	Check	106	157	98	0	0	0%
6	NWT/3/TAST/SPRW//TAW12399.75/4/OK82282//BOWINKT/5/PEHLIVAN	5588	15	75	106	155	112	15 S	10 MR	15%
7	RSK/NAC//90ZHONG657/3/TAM106/TX78V3630/4/F474S10.1	6055	13	81	106	155	118	0	20 S	0%
8	KSK46/BUC//DARI-16	5517	16	74	106	154	116	0	0	20%
9	TRK13//BOW/NKT/3/CHIL/2*STAR	8527	2	114	108	157	112	0	0	0%
10	SHARK-6/3/CROCI/AE.SQUARROSA(224)//2*OPATA	7300	9	97	108	157	115	30 S	0	20%
11	TX69A509.2//BBY/FOX/3/GRK//NO64/PEX/4/CER/5/KAUZ//ALTAR84/AOS	9621	1	128	108	157	115	0	0	0%
12	SOM-6//CA8055/GRK	5468	17	73	107	157	106	80 S	0	80%
13	SUBEN-1/SOM-7	5247	18	70	107	155	112	100 S	20 S	80%
14	ZHETISU//PYN/BAU/3/338-K1-1//ANB/BUC	6762	11	90	113	155	113	0	0	60%
15	UNOMLIBUGDAU/3/ADRI/BJY/NEE/4/AGRI/BJY/NEE	6206	12	83	110	154	117	0	0	50%
16	GRK/CTU//MESA/3RL6043/4*NAC/4/MNCH	7743	5	103	106	157	115	20 S	10 S	60%
17	BOW/NKT//DATIA1/3/AGRI/BJY/NEE	8419	3	112	110	155	113	0	0	0%
18	AGRI/NAC//MLT/3/KAUZ*2/CHEN//BCN/4/AGRI/NAC//MLT	8245	4	110	108	157	109	0	0	0%
19	ID13.1/MLT//ATTILA/3*BCN/3/ID13.1/MLT	7502	6	100	106	154	122	60 S	0	10%
20	TIRCHMIR1//71ST2959/CROW/4/NWT/3/TAST/SPRW//TAW12399.75	6869	10	92	106	157	118	0	20 S	5%
Mean		6709			108	156	112			
Max		9621			106	154	98			
Min		3992			106	154	98			
EMS		429689			4.9	0.498684	18.1842			
LSD <sub>0.05</sub>		1385.582			4.634	1.478	8.925			
F (Prob)		0			0.26	0	0.01			
CV %		10			2	0	4			



**Table23: Mean values for yield and other traits of the wheat genotypes tested in the 11<sup>th</sup> IWWYT-SA in 2008-2009 at, Herat Afghanistan**

Entry No.	Variety Name/Pedigree	Grain Yield			Days to Heading	Plant Height (cm)
		kg/ha	Rank	% of Check		
1	GEREK79	4554	10	121	155	117
2	ALTAY2000	4803	7	128	157	108
3	KARAHAN	3895	18	104	161	121
4	BAYRAKTAR	4021	17	107	154	113
5	LOCAL CHECK(Ghori)	3757	19	Check	157	91
6	NWT/3/TAST/SPRW//TAW12399.75/4/OK82282//BOWINKT/5/PEHLIVAN	5104	2	136	154	117
7	RSK/NAC//90ZHONG657/3/TAM106/TX78V3630/4/F474S10.1	4969	3	132	153	114
8	KSK46/BUC//DARI-16	4833	5	129	153	116
9	TRK13//BOW/NKT/3/CHIL/2*STAR	5691	1	151	156	91
10	SHARK-6/3/CROC1/AE.SQUARROSA(224)//2*OPATA	4022	16	107	155	105
11	TX69A509.2//BBY/FOX/3/GRK//NO64/PEX/4/CER/5/KAUZ//ALTAR84/AOS	4232	14	113	155	89
12	SOM-6//CA8055/GRK	4541	11	121	153	105
13	SUBEN-1/SOM-7	4687	8	125	157	113
14	ZHETISU//PYN/BAU/3/338-K1-1//ANB/BUC	4927	4	131	154	114
15	UNOMLIBUGDAU/3/ADRI/BJY/NEE/4/AGRI/BJY/NEE	3657	20	97	156	111
16	GRK/CTU//MESA/3RL6043/4*NAC/4/MNCH	4398	12	117	156	107
17	BOW/NKT//DATIA1/3/AGRI/BJY/NEE	4831	6	129	157	99
18	AGRI/NAC//MLT/3/KAUZ*2/CHEN/BCN/4/AGRI/NAC//MLT	4585	9	122	155	94
19	1D13.1/MLT//ATTILA/3*BCN/3/1D13.1/MLT	4282	13	114	154	109
20	TIRCHMIR1//71ST2959/CROW/4/NWT/3/TAST/SPRW//TAW12399.75	4034	15	107	153	98
Mean		4491			155	107
Max		5691			161	121
Min		3657			153	89
EMS		439959			6.18289	1.43655
LSD <sub>0.05</sub>		1485.838			5.205	2.692
F (Prob)		0.553			0.316	0
CV %		15			2	1

**Table24: across Mean values for yield and other traits of the wheat genotypes tested in the 11<sup>th</sup> IWWYT-SA in 2008-2009 at, two locations Afghanistan**

Variety		Grain Yield Takhar			Grain Yield Herat			Across Mean		
Entry No.	Name/Pedigree	kg/ha	Rank	% of Check	kg/ha	Rank	% of Check	Kg/ha	Rank	% of Check
1	GEREK79	4599	19	61	4554	10	121	4576	19	81
2	ALTAY2000	7301	8	97	4803	7	128	6052	6	108
3	KARAHAN	3992	20	53	3895	18	104	3943	20	70
4	BAYRAKTAR	5722	14	76	4021	17	107	4871	18	87
5	LOCAL CHECK	7497	7	Check	3757	19	Check	5627	10	100
6	NWT/3/TAST/SPRW//TAW12399.75/4/OK82282//BOWINKT/5/PEHLIVAN	5588	15	75	5104	2	136	5346	13	95
7	RSK/NAC//90ZHONG657/3/TAM106/TX78V3630/4/F474S10.1	6055	13	81	4969	3	132	5512	11	98
8	KSK46/BUC//DARI-16	5517	16	74	4833	5	129	5175	14	92
9	TRK13//BOW/NKT/3/CHIL/2*STAR	8527	2	114	5691	1	151	7109	1	126
10	SHARK-6/3/CROC1/AE.SQUARROSA(224)//2*OPATA	7300	9	97	4022	16	107	5661	9	101
11	TX69A509.2//BBY/FOX/3/GRK//NO64/PEX/4/CER/5/KAUZ//ALTAR84/AOS	9621	1	128	4232	14	113	6926	2	123
12	SOM-6//CA8055/GRK	5468	17	73	4541	11	121	5004	15	89
13	SUBEN-1/SOM-7	5247	18	70	4687	8	125	4967	16	88
14	ZHETISU//PYN/BAU/3/338-K1-1//ANB/BUC	6762	11	90	4927	4	131	5845	8	104
15	UNOMLIBUGDAU/3/ADRI/BJY/NEE/4/AGRI/BJY/NEE	6206	12	83	3657	20	97	4932	17	88
16	GRK/CTU//MESA/3RL6043/4*NAC/4/MNCH	7743	5	103	4398	12	117	6071	5	108
17	BOW/NKT//DATIA1/3/AGRI/BJY/NEE	8419	3	112	4831	6	129	6625	3	118
18	AGRI/NAC//MLT/3/KAUZ*2/CHEN//BCN/4/AGRI/NAC//MLT	8245	4	110	4585	9	122	6415	4	114
19	1D13.1/MLT//ATTILA/3*BCN/3/1D13.1/MLT	7502	6	100	4282	13	114	5892	7	105
20	TIRCHMIR1//71ST2959/CROW/4/NWT/3/TAST/SPRW//TAW12399.75	6869	10	92	4034	15	107	5451	12	97
Mean		6709			4491			5600		
Max		3992			5691			7109		
Min		3992			3657			3943		
EMS		429689			439959					
LSD0.05		1385.582			1485.838					
F (Prob)		0			0.553					
CV %		10			15					

**41<sup>st</sup> IBWSN 2008-2009**

Number of entries =153

Testing sites: Kabul, Baghlan, Balkh and Nangarhar

**Selected entries:**

**Kabul:** 1002, 1004, 1006, 1008, 1009, 1011, 1012, 1015, 1016, 1018, 1021, 1024, 1028, 1035, 1037, 1050, 1051, 1053, 1057, 1064, 1065, 1069, 1070, 1072, 1073, 1074, 1081, 1085, 1090, 1096, 1102, 1104, 1106, 1116, 1117, 1122, 1123, 1124, 1125, 1127, 1129, 1131, 1133, 1135, 1141, 1143, 1144, 1145, 1149, 1150, 1153 = 51

**Baghlan:** 1006, 1008, 1009, 1010, 1011, 1013, 1015, 1018, 1019, 1021, 1024, 1025, 1028, 1029, 1037, 1046, 1050, 1052, 1053, 1054, 1055, 1056, 1065, 1070, 1077, 1078, 1081, 1082, 1085, 1104, 1106, 1114, 1115, 1116, 1118, 1119, 1128, 1141, 1142, 1149, 1150, 1152 = 42

**Balkh:** Entries selected: 1004, 1009, 1014 = 3

**Nangarhar:** 1003, 1004, 1005, 1006, 1008, 1009, 1010, 1011, 1013, 1015, 1018, 1019, 1024, 1025, 1028, 1029, 1030, 1033, 1034, 1037, 1043, 1046, 1048, 1060, 1064, 1065, 1066, 1067, 1072, 1073, 1074, 1077, 1079, 1096, 1098, 1119, 1121, 1134, 1138, 1140, 1143, 1144, 1153 = 42

**26<sup>th</sup> SAWSN 2008-2009**

Number of entries =117

Testing sites: Takhar and Herat

**Selected entries:**

**Takhar:** 3007, 3013, 3015, 3016, 3017, 3019, 3024, 3025, 3026, 3029, 3033, 3034, 3036, 3037, 3057, 3070, 3071, 3075, 3077 = 19

**Herat:** 3030, 3031, 3040, 3052, 3057, 3066, 3067, 3068, 3069, 3072, 3085, 3092, 3101, 3102, 3106, 3113, 3114 = 17

**16<sup>th</sup> FAWWON IRR 2008-2009**

Number of entries =90

Testing site: Bamyan

**Selected entries:**

**Bamyan:** 7, 8, 12, 13, 18, 19, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 40, 41, 42, 47, 48, 49, 51, 52, 53, 54, 55, 56, 57, 58, 61, 62, 63, 64, 65, 66, 67, 68, 69, 71, 72, 73, 74, 75, 77, 79, 80, 81, 84, 85, 86, 88, 89, 90 = 57

**16<sup>th</sup> FAWWON-SA 2008-2009**

Number of entries =165

Testing site: Takhar

**Selected entries:**

**Takhar:** 106, 108, 109, 110, 113, 115, 116, 117, 120, 122, 124, 125, 126, 127, 131, 151, 152, 154, 157, 162 = 20

**3<sup>rd</sup> STEMRRSN (3<sup>rd</sup> Stem Rust Resistance Screening Nursery)**

Testing site: Kabul

Number of Entries: 110 (6001-6110)

Entries selected: 6002, 6003, 6007, 6008, 6010, 6017, 6024, 6025, 6026, 6028, 6029, 6030, 6031, 6035, 6037, 6038, 6039, 6041, 6042, 6046, 6047, 6048, 6050, 6051, 6053, 6054, 6055, 6056, 6058, 6059, 6063, 6067, 6068, 6069, 6070, 6072, 6073, 6074, 6075, 6076, 6077, 6078, 6079, 6083, 6084, 6085, 6093, 6094, 6097, 6102, 6103, 6107, 6108, 6109, 6110 = 55

**2<sup>nd</sup> STEMRRSN (2<sup>nd</sup> Stem Rust Resistance Screening Nursery)**

Testing site: Kabul

Number of Entries: 137 (6001-6137)

Entries selected: 6002, 6004, 6005, 6012, 6013, 6014, 6016, 6020, 6024, 6025, 6028, 6029, 6030, 6035, 6050, 6062, 6063, 6064, 6065, 6072, 6073, 6075, 6076, 6086, 6087, 6121, 6122, 6123, 6124, 6126, 6127, 6128, 6129, 6130, 6135, 6136, 6137 = 37

### 3. National trials

#### National Uniform Yield Trials (NUT, 08-09)

##### Materials and methods

This study was conducted using a set of 40 wheat genotypes comprising of selected advance varieties of 2<sup>nd</sup> and 3<sup>rd</sup> EBWYT, 27<sup>th</sup> and 28<sup>th</sup> ESWYT, 1<sup>st</sup> STRRSN, NUT Pak, pre release FAO lines, French advanced varieties and a local commercial cultivar, which changed at different sites based on farmers' preference (Table 25). The wheat genotypes were tested at eight sites representing diverse wheat growing environments across Afghanistan (Table, 26-33). The study was conducted during the wheat-growing season (Nov. to July) in 2008-2009 using a randomized complete block design with genotypes arranged in alpha lattice combination in two replications. Individual experimental plots of 6.0 m<sup>2</sup> were seeded as six 5.0-m long rows with 0.20-m, row spacing. Fertilizers were mixed into the soil prior to seeding using different doses in different locations. The experimental plots were hand weeded as necessary at individual sites. The other trial management practices were consistent with good crop husbandry recommended for each site.

Days to heading was recorded when spikes of approximately 50% of the plants in a plot were fully emerged. At maturity, plant height in each plot was measured from ground level to the tip of the spikes. Days to maturity were recorded when glumes completely lost their green color. Agronomic score of the genotypes at maturity was recorded using a scale of 1 to 5 with 5 representing the best combination of agronomic traits based on the criteria circulated in Cimmyt wheat trial field books. Plants were hand-harvested at the ground level from the middle 3.2 m<sup>2</sup> in each plot. After threshing, grain weight was recorded. Disease scorings were recorded whenever present in the plots.

Analysis of variance was conducted for each site. To determine the significance of differences among the genotype in each specific environment

## Results and discussion

The 2008-2009 wheat growing season was normal for most part of the crop cycle. Stripe and leaf rust incidence occurred at certain places. The wheat yield levels were high at all sites (Table 34).

Grain yield of the genotypes averaged over sites ranged from 4878 to 6757 with overall mean of 5953 Kg/ha. The highest mean yield was obtained in Helmand whereas the lowest mean yield of 4345 Kg/ha, perhaps because of stress and poor field management was recorded in Kabul. Yield performance of genotypes differed from site to site. Significant genotypic variation was observed at Kabul, Kunduz, Takhar, Herat, Balkh and Nangarhar. A yellow rust score ranging from 40 MS to 10 S was recorded on entries # 3, 8, 9, 10, 13, 15, 24, 27, 29, 30, 31, 33 and 35. No yellow rust incidence was observed in North, Northeast and West agricultural zones of Afghanistan. The following entries were found promising:

Kabul: 1, 2, 4, 5, 6, 7, 11, 12, 14, 16, 18, 19, 20, 21, 26, 28, 32, and 37

Baghlan: 2, 11, 12, 14, 16, 17, 21, 22, 23, 28, 32, 34, 36, and 37

Kunduz: 2, 16, 17, 19, 21, 22, 23, 26, 28 and 32

Takhar: 5,7, 17, 18, 19, 21, 23, 28, 34 and 36

Balkh: 1, 7, 13, 14, 16, 17, 18, 19, 21, 23, 26, 34 and 36

Herat: 1, 2 16, 17, 26, 34 and 36

Nangarhar: 23 and 32

Helmand: 1, 2, 6, 11, 12, 16, 17, 20, 21, 26, 28, 36 and 37

**Conclusion:**

Based on grain yield, wide adaptation, resistance to diseases and agronomic performance entry # 1 rank 20, 2 rank 12, 5 rank 26, 6 rank 22, 7 rank 31, 12 rank 14, 14 rank 21, 16 rank 4, 17 rank 7, 18 rank 23, 19 rank 28, 21 rank 1, 23 rank 13, 26 rank 30, 28 rank 9, 32 rank 10, 34 rank 17, 36 rank 11, and 37 rank 19 were found better compared to current commercial wheat varieties entry # 38 which ranked at # 32. The promising entries will be considered for further testing in 2009.

Table 25 NUT 2009

Variety		Origin	Seed Source
No	Name/Pedigree		
1	MILAN/OTUS//ATTILA/3*BCN	27th ESWYT#41-2007	NUT 2007-2008 # 5
2	OASIS/SKAUZ//4*BCN/3/2*PASTOR	2nd EBWYT#14-2007	NUT 2007-2008 # 9
3	BABAX/LR42//BABAX*2/3/VIVITSI	2nd EBWYT#19-2007	NUT 2007-2008 # 11
4	HPO/TAN/VEE/3/2*PGO/4/MILAN/5/SSEI	2nd EBWYT#27-NA	NUT 2007-2008 # 12
5	IRENA/WEAVER	Prerelease - FAO	NUT 2007-2008 # 17
6	Prl/2*Pastor	24th ESWYT#47	NUT 2007-2008 # 24
7	CROC_1/AE.SQUARROSA (205)//KAUZ/3/ATTILA	35th IBWSN#157	NUT 2007-2008 # 25
8	CDNO/R143//ENTE/MEXI		NUT 2007-2008 # 35
9	SERI/RAYON	28th ESWYT	28th ESWYT # 103
10	HD2687	28th ESWYT	28th ESWYT # 104
11	HPO/TAN//VEE/3/2*PGO/4/MILAN/5/SSERI	28th ESWYT	28th ESWYT # 108
12	KAUZ//ALTAR 84/AOS/3/MILAN/KAUZ/4/HUITES	28th ESWYT	28th ESWYT # 112
13	KAUZ//ALTAR 84/AOS/3/MILAN/KAUZ/4/HUITES	28th ESWYT	28th ESWYT # 113
14	WEAVER/3/SAPI/TEAL//HU1/4/CROC_1/AE.SQUARROSA (213)//PGO/5/SKAUZ*2/SRMA	28th ESWYT	28th ESWYT # 114
15	CS/TH.SCI/3*PVN/3/MIRLO/BUC/4/MILAN/5/TILHI	28th ESWYT	28th ESWYT # 115
16	CAL/NH/H567.71/3/SERI/4/CAL/NH/H567.71/5/2*KAUZ/6/PASTOR	28th ESWYT	28th ESWYT # 123
17	OASIS/SKAUZ//4*BCN/3/2*PASTOR	28th ESWYT	28th ESWYT # 132
18	DVERD_2/AE.SQUARROSA (221)/3/URES/BOW//OPATA/4/TILHI	28th ESWYT	28th ESWYT # 133
19	TUKURU//BAV92/RAYON	28th ESWYT	28th ESWYT # 142
20	TUKURU//BAV92/RAYON	28th ESWYT	28th ESWYT # 143
21	SUNSU/CHIBIA	28th ESWYT	28th ESWYT # 144
22	KAUZ/PASTOR/PBW343	28th ESWYT	28th ESWYT # 145
23	WBLL1*2/4/YACO/PBW65/3/KAUZ*2/TRAP//KAUZ	28th ESWYT	28th ESWYT # 147
24	BABAX/LR42//BABAX*2/3/VIVITSI	3rd EBWYT	3rd EBWYT # 523
25	WBLL1*2/KIRITATI	3rd EBWYT	3rd EBWYT # 527
26	WAXWING*2/KIRITATI	3rd EBWYT	3rd EBWYT # 529
27	V-03079(CIMMYT material )	NUT (Pak) NS	NUT (pak) NS 2007-2008 # 5
28	URES/JUN//KAUZ	NUT (Pak) NS	NUT (pak) NS 2007-2008 # 6
29	4770/Barani-83	NUT (Pak) NS	NUT (pak) NS 2007-2008 # 12
30	SEHER-2006 Cultivar in Pax	NUT (Pak) NS	NUT (pak) NS 2007-2008 # 13
31	ATAILLA	NUT (Pak) NS	NUT (pak) NS 2007-2008 # 16
32	WBLL1*2/TUKURU	27th ESWYT#48	AYT-1 2007-2008 # 10
33	REH/HARE//2*BCN/3/CROC_1/AE.SQUARROSA (213)//PGO/4/HUITES	2nd EBWYT#16	AYT-1 2007-2008 # 14
34	SERI.1B*2/3/KAUZ*2/BOW//KAUZ	1st EBWYT#22	AYT-1 2007-2008 # 15
35	Parus/Pastor	12th SAWYT#22	AYT-2 2007-2008 # 9
36	PASTOR/3/VORONA/CNO79//KAUZ	26th ESWYT#16	AYT-2 2007-2008 # 32
37	SERI*3//RL6010/4*YR/3/PASTOR/4/BAV92	1st STEMRRSN # 6025	PYT (1st STEMRRSN) DA 2007-2008 # 15
38	CHECK (various)		PYT (1st STEMRRSN) DA 2007-2008 # 7

Note: Entry# 24 and 26 were removed from the list because they did not germinate in all stations



**Table26: Yield performance and other traits of 38 wheat genotypes tested in the NUT in 2008-2009 at Kabul, Afghanistan**

Entry No.	Variety Name/Pedigree	Grain Yield			Days to		Plant Height (cm)	% of Stand	1000 GWt	Agronomic Score	G.Color	YR	SEL
		Kg/ha	Rank	% of Check	Heading	Maturity							
1	MILAN/OTUS//ATTILA/3*BCN	4525	19	112	134	175	76	77	40	4	A	0	
2	OASIS/SKAUZ//4*BCN/3/2*PASTOR	4559	18	112	129	176	75	78	48	4	RA	0	
3	BABAX/LR42//BABAX*2/3/VIVITSI	4902	11	121	133	176	80	77	44	4	LA	40S	
4	HPO/TAN/VEE/3/2*PGO/4/MILAN/5/SSEI	4855	12	120	131	173	77	78	44	4	LA	5R	
5	IRENA/WEAVER	5347	4	132	138	170	79	83	36	4	LA	20MR	*
6	Pr1/2*Pastor	5500	1	136	134	174	76	83	44	5	LA	40MR	
7	CROC_1/AE.SQUARROSA (205)//KAUZ/3/ATTILA	5090	7	125	135	174	73	76	35	3	A	10MR	*
8	CDNO/R143//ENTE/MEXI	4814	13	119	132	178	67	65	40	4	LA	5R	*
9	SERI/RAYON	2800	35	69	132	173	66	48	36	3	A	80S	
10	HD2687	3284	34	81	133	173	67	55	36	3	A	60S	
11	HPO/TAN//VEE/3/2*PGO/4/MILAN/5/SSEI1	4324	24	107	132	171	77	77	40	4	LA	10R	*
12	KAUZ//ALTAR 84/AOS/3/MILAN/KAUZ/4/HUITES	5234	6	129	131	173	80	74	40	4	A	10R	*
13	KAUZ//ALTAR 84/AOS/3/MILAN/KAUZ/4/HUITES	4453	22	110	130	171	71	65	35	3	RA	40MS	
14	WEAVER/3/SAPI/TEAL//HUI/4/CROC_1/AE.SQUARROSA (213)//PGO/5/SKAUZ*2/SRMA	4438	23	109	135	174	76	58	36	3	A	5R	
15	CS/TH.SC//3*PVN/3/MIRLO/BUC/4/MILAN/5/TILHI	2226	37	55	131	177	58	40	34	3	RA	100S	
16	CAL/NH//H567.71/3/SERI/4/CAL/NH//H567.71/5/2*KAUZ/6/PASTOR	4706	15	116	131	173	73	77	45	4	A	10MR	*
17	OASIS/SKAUZ//4*BCN/3/2*PASTOR	3926	30	97	137	178	75	62	40	3	A	TR	*
18	DVERD_2/AE.SQUARROSA (221)/3/URES/BOW//OPATA/4/TILHI	5417	3	133	131	171	80	83	35	3	A	5R	*
19	TUKURU//BAV92/RAYON	4468	20	110	130	172	77	80	45	4	A	TR	*
20	TUKURU//BAV92/RAYON	4904	10	121	132	173	81	55	42	4	LA	0	*
21	SUNSU/CHIBIA	5437	2	134	135	172	75	62	48	4	LA	5R	*
22	KAUZ/PASTOR//PBW343	3770	31	93	132	176	79	50	40	4	A	0	
23	WBLL1*2/4/YACO/PBW65/3/KAUZ*2/TRAP//KAUZ	2658	36	65	133	176	76	43	40	4	LA	5R	
24	WBLL1*2/KIRITATI	1405	38	35	131	177	62	35	40	4	A	80S	
25	V-03079(CIMMYT material)	4191	28	103	132	175	79	50	45	5	LA	20MR	
26	URES/JUN//KAUZ	4592	17	113	131	174	74	45	45	4	LA	40MR	
27	4770/Barani-83	5267	5	130	131	173	79	74	40	4	A	40M	
28	SEHER-2006.cultivar in Pax	4804	14	118	134	175	77	70	42	4	A	0	*

29	ATAILLA	3766	32	93	133	174	72	40	40	4	A	60S	
30	WBLL1*2/TUKURU	4465	21	110	135	176	83	45	48	4	LA	60MS	
31	REH/HARE//2*BCN/3/CROC_1/AE.SQUARROSA (213)//PGO/4/HUITES	3377	33	83	133	177	74	45	45	4	LA	40MS	
32	SERI.1B*2/3/KAUZ*2/BOW//KAUZ	4275	25	105	132	177	78	65	48	4	A	20MS	
33	Parus/Pastor	4250	27	105	134	178	71	70	36	4	A	40MS	
34	PASTOR/3/VORONA/CNO79//KAUZ	5069	8	125	136	179	73	59	35	4	RA	10MR	
35	BABAX/LR42//BABAX	5012	9	124	134	178	77	75	35	3	RA	60S	
36	TUKURU/PASTOR	4252	26	105	134	177	78	82	32	3	A	20MS	
37	SERI*3//RL6010/4*YR/3/FASTOR/4/BAV92	4684	16	115	133	179	79	77	37	4	A	0	*
38	CHECK ( Ariana 07 )	4059	29	Check	138	179	76	65	45	4	A	TR	

Mean		4345			133	175	75	64					
Max		5500			138	179	83	83					
Min		1405			129	170	58	35					
EMS		594539			1.40825	1.426	33.994	169.935					
LSD0.05		1741.107			2.405	2.658	13.176	26.847					
F (Prob)		0.007			0	0	0.243	0.005					
CV %		18			1	1	8	20					

**Table 27: Yield performance and other traits of 38 wheat genotypes tested in the NUT in 2008-2009 at Baghlan, Afghanistan**

Entry No.	Variety Name/Pedigree	Grain Yield			Days to		Plant	% of	LOD	1000	Field
		Kg/ha	Rank	% of Check	Heading	Maturity	Height (cm)	Stand		GWt.	Selection
1	MILAN/OTUS//ATTILA/3*BCN	4877	27	117	97	149	102	89		29	
2	OASIS/SKAUZ//4*BCN/3/2*PASTOR	5405	22	130	92	147	105	96		38	
3	BABAX/LR42//BABAX*2/3/VIVITSI	6950	2	167	93	146	105	94		34	
4	HPO/TAN/VEE/3/2*PGO/4/MILAN/5/SSEI	4402	31	106	94	144	106	92		45	
5	IRENA/WEAVER	4083	35	98	103	149	112	91	15	27	
6	Pri/2*Pastor	4601	30	110	99	148	108	95	60	36	
7	CROC_1/AE.SQUARROSA (205)//KAUZ/3/ATTILA	3974	36	95	101	147	101	96	10	44	
8	CDNO/R143//ENTE/MEXI	4374	32	105	99	148	101	94	20	35	
9	SERI/RAYON	5181	23	124	94	146	99	85		36	
10	HD2687	6325	9	152	99	149	99	95		38	
11	HPO/TAN//VEE/3/2*PGO/4/MILAN/5/SSEI	6497	7	156	98	148	102	92	40	41	
12	KAUZ//ALTAR 84/AOS/3/MILAN/KAUZ/4/HUITES	4972	26	119	93	145	106	98	50	36	
13	KAUZ//ALTAR 84/AOS/3/MILAN/KAUZ/4/HUITES	6306	11	151	92	145	100	96	40	38	
14	WEAVER/3/SAPI/TEAL//HUI/4/CROC_1/AE.SQUARROSA(213)//PGO/5/SKAUZ*2/SRMA	5655	19	136	98	145	106	97	10	36	
15	CS/TH.SC//3*PVN/3/MIRLO/BUC/4/MILAN/5/TILHI	6188	15	149	90	145	98	98	5	43	
16	CAL/NH//H567.71/3/SERI/4/CAL/NH//H567.71/5/2*KAUZ/6/PASTOR	6403	8	154	93	147	107	96	20	34	
17	OASIS/SKAUZ//4*BCN/3/2*PASTOR	5432	21	130	100	148	108	96	10	32	
18	DVERD_2/AE.SQUARROSA (221)/3/URES/BOW//OPATA/4/TILHI	3482	37	84	93	147	96	92	30	34	
19	TUKURU//BAV92/RAYON	4761	28	114	94	147	106	98	30	35	
20	TUKURU//BAV92/RAYON	4641	29	111	96	148	104	96	50	40	
21	SUNSU/CHIBIA	6730	5	162	98	146	99	95	30	39	
22	KAUZ/PASTOR//PBW343	5756	18	138	97	143	100	72	10	47	
23	WBLL1*2/4/YACO/PBW65/3/KAUZ*2/TRAP//KAUZ	6716	6	161	95	146	102	80		39	
24	WBLL1*2/KIRITATI	6311	10	152	91	147	100	31		56	
25	V-03079(CIMMYT material)	5007	25	120	92	144	107	91	10	47	
26	URES/JUN//KAUZ	4314	33	104	91	147	106	94	40	34	
27	4770/Barani-83	7110	1	171	92	145	102	93		41.5	
28	SEHER-2006.cultivar in Pax	5563	20	134	94	145	99	94		35	
29	ATAILLA	6247	13	150	95	148	94	78		30	
30	WBLL1*2/TUKURU	6902	3	166	99	149	108	88		41	
31	REH/HARE//2*BCN/3/CROC_1/AE.SQUARROSA (213)//PGO/4/HUITES	6013	16	144	97	150	106	78		38	
32	SERI.1B*2/3/KAUZ*2/BOW//KAUZ	6807	4	163	95	147	105	90		42	

33	Parus/Pastor	3088	38	74	98	149	98	96	50	30
34	PASTOR/3/VORONA/CNO79//KAUZ	5024	24	121	106	150	113	89		34
35	SERI*3//RL6010/4*YR/3/FASTOR/4/BAV92	5847	17	140	99	147	95	96		33
36	TUKURU/PASTOR	6227	14	149	96	147	103	94		34
37	SKAUZ/Bav92	6274	12	151	96	147	109	93		47
38	CHECK (Ghori-96)	4166	34	Check	95	148	97	90		37

Mean		5489			96	147	103	90		
Max		7110			106	150	113	98		
Min		3088			90	143	94	31		
EMS		1.15E+06			2.53886	2.86816	36.522	46.4315		
LSD0.05		2176.131			3.898	4.129	13.622	15.306		
F (Prob)		0.025			0	0.141	0.5	0		
CV %		19.6			1.7	1.2	5.9	7.6		

**Table 28: Yield performance and other traits of 38 wheat genotypes tested in the NUT in 2008-2009 at Kunduz, Afghanistan**

Entry No.	Variety	Grain Yield			Days to		Plant Height (cm)	LOD	1000 GWT	% Stand	Field Selection
	Name/Pedigree	Kg/ha	Rank	% fo Check	Heading	Maturity					
1	MILAN/OTUS//ATTILA/3*BCN	4700	32	95	99	139	105	40	39	98	
2	OASIS/SKAUZ//4*BCN/3/2*PASTOR	6302	1	128	91	139	105	65	44	98	
3	BABAX/LR42//BABAX*2/3/VIVITSI	5621	17	114	91	140	118	55	43	98	
4	HPO/TAN/VEE/3/2*PGO/4/MILAN/5/SSEI	5199	21	105	91	137	105	85	45	97	
5	IRENA/WEAVER	4620	34	94	100	143	103	50	38	96	
6	Pri/2*Pastor	4724	30	96	98	142	105	95	39	97	
7	CROC_1/AE.SQUARROSA (205)//KAUZ/3/ATTILA	4976	25	101	98	143	100	55	36	99	
8	CDNO/R143//ENTE/MEXI	5715	13	116	93	139	108	55	39	97	
9	SERI/RAYON	5415	20	110	90	140	110	75	39	89	
10	HD2687	6199	2	125	91	136	105	5	40	93	
11	HPO/TAN//VEE/3/2*PGO/4/MILAN/5/SSERI1	5005	23	101	91	138	108	40	44	96	
12	KAUZ//ALTAR 84/AOS/3/MILAN/KAUZ/4/HUITES	5138	22	104	90	140	110	25	39	96	
13	KAUZ//ALTAR 84/AOS/3/MILAN/KAUZ/4/HUITES	4302	38	87	90	139	103	70	37	96	
14	WEAVER/3/SAPI/TEAL//HUI/4/CROC_1/AE.SQUARROSA (213)//PGO/5/SKAUZ*2/SRMA	4778	29	97	91	138	110	70	36	96	
15	CS/TH.SC//3*PVN/3/MIRLO/BUC/4/MILAN/5/TILHI	5433	19	110	89	135	100	10	46	97	
16	CAL/NH//H567.71/3/SERI/4/CAL/NH//H567.71/5/2*KAUZ/6/PASTOR	5622	16	114	93	142	110	30	44	95	
17	OASIS/SKAUZ//4*BCN/3/2*PASTOR	5997	5	121	98	138	108	35	40	96	
18	DVERD_2/AE.SQUARROSA (221)/3/URES/BOW//OPATA/4/TILHI	4927	28	100	90	140	105	95	45	96	
19	TUKURU//BAV92/RAYON	5471	18	111	92	140	105	5	44	99	
20	TUKURU//BAV92/RAYON	4986	24	101	89	138	110	30	43	91	
21	SUNSU/CHIBIA	5715	12	116	95	141	113	80	44	93	
22	KAUZ/PASTOR//PBW343	5767	8	117	94	139	105	40	46	80	
23	WBLL1*2/4/YACO/PBW65/3/KAUZ*2/TRAP//KAUZ	5736	9	116	91	141	118	25	44	79	
24	WBLL1*2/KIRITATI	4939	27	100	86	139	105	15	56	67	
25	V-03079(CIMMYT material)	4371	36	88	89	134	115	45	47	91	
26	URES/JUN//KAUZ	5724	11	116	90	137	105	25	42	87	
27	4770/Barani-83	5946	6	120	89	137	110	5	46	92	
28	SEHER-2006.cultivar in Pax	5624	15	114	90	141	100	75	37	91	

29	ATAILLA	5702	14	115	90	141	110	50	41	87	
30	WBLL1*2/TUKURU	5829	7	118	94	145	123	0	49	81	
31	REH/HARE//2*BCN/3/CROC. 1/AE.SQUARROSA (213)//PGO/4/HUITES	6139	3	124	92	144	108	0	41	78	
32	SERI.1B*2/3/KAUZ*2/BOW//KAUZ	5730	10	116	89	142	115	35	46	79	
33	Parus/Pastor	4307	37	87	91	144	103	90	34	93	
34	PASTOR/3/VORONA/CNO79//KAUZ	4579	35	93	100	143	113	60	38	94	
35	SERI*3//RL6010/4*YR/3/FASTOR/4/BAV92	6104	4	124	93	143	110	25	38	95	
36	TUKURU/PASTOR	4688	33	95	95	144	110	45	37	95	
37	SKAUZ/Bav92	4719	31	96	92	142	115	100	37	97	
38	Local Check (Darulaman 07 )	4941	26	Check	90	142	108	100	42	98	

Mean		5308			92	140	108	48	42	92	
Max		6302			100	145	123	100	56	99	
Min		4302			86	134	100	0	34	67	
EMS		224373			5.18	2.01	29.85	741.57	11.24	84.39	
LSD0.05		1064			4.6	3.1	11.1	55.2	6.8	18.6	
F (Prob)		0.002			0	0	0.04	0.005	0	0.221	
CV %		8.9			2.5	1.0	5.0	57.3	8.0	10.0	

**Table 29: Yield performance and other traits of 38 wheat genotypes tested in the NUT in 2008-2009 at Takhar, Afghanistan**

Variety	Name/Pedigree	Grain Yield			Days to		Plant	Field
Entry No		Kg/ha	Rank	% of Check	Heading	Maturity	Height (cm)	Selection
1	Ghori 96	6017	30	87	109	154	107	
2	OASIS/SKAUZ//4*BCN/3/2*PASTOR	6430	28	93	106	153	90	
3	BABAX/LR42//BABAX*2/3/VIVITSI	8262	1	120	107	154	115	
4	HPO/TAN/VEE/3/2*PGO/4/MILAN/5/SSEI	5966	31	87	105	152	102	
5	IRENA/WEAVER	7111	14	103	110	153	97	
6	PrI/2*Pastor	6519	26	95	108	155	101	
7	CROC_1/AE.SQUARROSA (205)//KAUZ/3/ATTILA	7281	10	106	108	155	103	
8	CDNO/R143//ENTE/MEXI	7717	6	112	110	156	99	
9	SERI/RAYON	6600	23	96	111	154	100	
10	HD2687	8111	2	118	109	154	94	
11	HPO/TAN/VEE/3/2*PGO/4/MILAN/5/SSERII	5241	36	76	105	153	96	
12	KAUZ//ALTAR 84/AOS/3/MILAN/KAUZ/4/HUITES	5878	33	85	105	152	99	
13	KAUZ//ALTAR 84/AOS/3/MILAN/KAUZ/4/HUITES	6051	29	88	105	153	99	
14	WEAVER/3/SAPI/TEAL//HUI/4/CROC_1/AE.SQUARROSA(213)//PGO/5/SKAUZ*2/SRMA	6719	21	97	107	152	101	
15	CS/TH.SC/3*PVN/3/MIRLO/BUC/4/MILAN/5/TILHI	5842	34	85	104	152	94	
16	CAL/NH/H567.71/3/SERI/4/CAL/NH/H567.71/5/2*KAUZ/6/PASTOR	6530	24	95	106	153	95	
17	OASIS/SKAUZ//4*BCN/3/2*PASTOR	7885	4	114	109	154	92	
18	DVERD_2/AE.SQUARROSA (221)/3/URES/BOW//OPATA/4/TILHI	7209	12	105	107	153	106	
19	TUKURU//BAV92/RAYON	7198	13	104	106	153	105	
20	TUKURU//BAV92/RAYON	6723	20	98	107	153	101	
21	SUNSU/CHIBIA	7578	8	110	110	156	101	
22	KAUZ/PASTOR//PBW343	5443	35	79	109	155	93	
23	WBLL1*2/4/YACO/PBW65/3/KAUZ*2/TRAP//KAUZ	7738	5	112	108	154	105	
24	WBLL1*2/KIRITATI	5222	37	76	104	153	91	
25	V-03079(CIMMYT material)	6511	27	94	106	152	103	
26	URES/JUN//KAUZ	1995	38	29	110	156	95	
27	4770/Barani-83	6701	22	97	105	154	102	
28	SEHER-2006.cultivar in Pax	7068	15	103	108	155	96	

29	ATAILLA	6885	19	100	108	153	95
30	WBLL1*2/TUKURU	7346	9	107	108	154	108
31	REH/HARE//2*BCN/3/CROC_1/AE.SQUARROSA (213)//PGO/4/HUITES	5934	32	86	106	154	99
32	SERL1B*2/3/KAUZ*2/BOW//KAUZ	6523	25	95	105	151	100
33	Parus/Pastor	7624	7	111	108	155	109
34	PASTOR/3/VORONA/CNO79//KAUZ	7222	11	105	109	155	99
35	SERI*3//RL6010/4*YR/3/FASTOR/4/BAV92	7945	3	115	108	154	100
36	TUKURU/PASTOR	7028	16	102	109	153	104
37	SKAUZ/Bav92	6907	17	100	108	153	105
38	CHECK (Lalmi-2)	6892	18	100	109	154	92

Mean		6680			107	154	100
Max		8262			111	156	115
Min		1995			104	151	90
EMS		422340			2.98024	1.56946	14.573
ESD0.05		1442.04			3.53	2.83	7.84
F (Prob)		0			0.005	0.15	0
CV %		10			2	1	4



**Table 30: Yield performance and other traits of 38 wheat genotypes tested in the NUT in 2008-2009 at Balkh, Afghanistan**

Entry No.	Variety Name/Pedigree	Grain Yield			Days to		Plant Height (cm)	1000 GWT.	Field Selection
		kg/ha	Rank	% of Check	Heading	Maturity			
1	MILAN/OTUS//ATTILA/3*BCN	4625	15	113	100	143	92	30	
2	OASIS/SKAUZ//4*BCN/3/2*PASTOR	4354	25	106	94	142	95	40	
3	BABAX/LR42//BABAX*2/3/VIVITSI	4934	4	120	97	145	109	35	
4	HPO/TAN/VEE/3/2*PGO/4/MILAN/5/SSEI	3820	34	93	95	143	94	45	
5	IRENA/WEAVER	4358	24	106	102	143	99	30	
6	Pr1/2*Pastor	4290	26	104	102	146	95	35	
7	CROC_1/AE.SQUARROSA (205)//KAUZ/3/ATTILA	4470	18	109	101	144	92	35	
8	CDNO/R143//ENTE/MEXI	4842	8	118	101	143	93	30	
9	SERI/RAYON	4787	10	116	101	144	94	35	
10	HD2687	4903	5	119	102	144	97	40	
11	HPO/TAN//VEE/3/2*PGO/4/MILAN/5/SSEI1	4238	28	103	97	143	92	40	
12	KAUZ//ALTAR 84/AOS/3/MILAN/KAUZ/4/HUITES	4245	27	103	96	141	98	45	
13	KAUZ//ALTAR 84/AOS/3/MILAN/KAUZ/4/HUITES	4663	14	113	96	143	100	35	
14	WEAVER/3/SAPI/TEAL//HUI/4/CROC_1/AE.SQUARROSA(213)//PGO/5/SKAUZ*2/SRMA	4683	13	114	99	142	98	50	
15	CS/TH.SC//3*PVN/3/MIRLO/BUC/4/MILAN/5/TILHI	4805	9	117	95	141	91	35	
16	CAL/NH//H567.71/3/SERI/4/CAL/NH//H567.71/5/2*KAUZ/6/PASTOR	5113	3	124	97	144	104	35	
17	OASIS/SKAUZ//4*BCN/3/2*PASTOR	4869	7	118	102	146	100	40	
18	DVERD_2/AE.SQUARROSA (221)/3/URES/BOW//OPATA/4/TILHI	5138	2	125	97	143	104	35	
19	TUKURU//BAV92/RAYON	4726	12	115	96	143	105	40	
20	TUKURU//BAV92/RAYON	4225	29	103	98	144	102	35	
21	SUNSU/CHIBIA	4776	11	116	101	145	106	40	
22	KAUZ/PASTOR//PBW343	3563	36	87	105	147	83	40	
23	WBLL1*2/4/YACO/PBW65/3/KAUZ*2/TRAP//KAUZ	4401	21	107	99	143	102	40	
24	WBLL1*2/KIRITATI	3499	38	85	97	145	91	45	
25	V-03079(CIMMYT material)	3570	35	87	96	142	99	45	
26	URES/JUN//KAUZ	4492	17	109	97	143	95	40	
27	4770/Barani-83	4458	19	108	97	142	94	45	
28	SEHER-2006.cultivar in Pax	4379	22	107	96	146	94	35	
29	ATAILLA	4553	16	111	100	145	99	40	
30	WBLL1*2/TUKURU	4041	32	98	101	146	105	40	
31	REH/HARE//2*BCN/3/CROC_1/AE.SQUARROSA (213)//PGO/4/HUITES	3509	37	85	97	147	89	40	

32	SERI.1B*2/3/KAUZ*2/BOW//KAUZ	4370	23	106	97	143	97	40	
33	Parus/Pastor	4007	33	97	101	147	96	30	
34	PASTOR/3/VORONA/CNO79//KAUZ	4419	20	108	101	147	103	25	
35	SERI*3//RL6010/4*YR/3/FASTOR/4/BAV92	5181	1	126	98	145	107	35	
36	TUKURU/PASTOR	4902	6	119	101	143	104	40	
37	SKAUZ/Bav92	4173	30	102	101	143	104	30	
38	CHECK (Amu-99)	4110	31	Check	104	147	108	30	

Mean		4434			99	144	98		
Max		5181			105	147	109		
Min		3499			94	141	83		
EMS		123455			1.69778	1.06721	29.5053		
LSD0.05		802.98			2.843	2.093	11.006		
F (Prob)		0.001			0	0	0.004		
CV %		8			1	1	6		

**Table 31: Yield performance and other traits of 38 wheat genotypes tested in the NUT in 2008-2009 at Herat, Afghanistan**

Entry No.	Variety Name/Pedigree	Grain Yield			Days to		Plant Height (cm)	1000 GWT	Colour	SEL
		Kg/ha	Rank	% of Check	Heading	Maturity				
1	MILAN/OTUS//ATTILA/3*BCN	8005	7	144	106	153	108	70	W	**
2	OASIS/SKAUZ//4*BCN/3/2*PASTOR	8148	4	147	104	152	117	65	A	**
3	BABAX/LR42//BABAX*2/3/VIVITSI	7116	27	128	103	153	125	75	A	**
4	HPO/TAN/VEE/3/2*PGO/4/MILAN/5/SSEI	5123	37	92	100	152	117	70	A	
5	IRENA/WEAVER	7242	25	130	114	155	109	50	A	***
6	Pr1/2*Pastor	6747	31	121	106	154	117	60	A	**
7	CROC_1/AE.SQUARROSA (205)//KAUZ/3/ATTILA	6362	35	114	108	155	114	50	A	***
8	CDNO/R143//ENTE/MEXI	6792	30	122	104	155	112	55	A	***
9	SERI/RAYON	8871	2	160	103	152	112	60	A	**
10	HD2687	9045	1	163	103	153	109	50	A	***
11	HPO/TAN//VEE/3/2*PGO/4/MILAN/5/SSERI	4714	38	85	98	151	110	65	A	
12	KAUZ//ALTAR 84/AOS/3/MILAN/KAUZ/4/HUITES	7493	19	135	97	166	112	60	A	**
13	KAUZ//ALTAR 84/AOS/3/MILAN/KAUZ/4/HUITES	7337	22	132	99	181	109	60	A	**
14	WEAVER/3/SAPI/TEAL//HUI/4/CROC_1/AE.SQUARROSA (213)//PGO/5/SKAUZ*2/SRMA	7521	18	135	103	166	114	50	A	**
15	CS/TH.SC//3*PVN/3/MIRLO/BUC/4/MILAN/5/TILHI	7297	24	131	96	151	96	80	A	
16	CAL/NH//H567.71/3/SERI/4/CAL/NH//H567.71/5/2*KAUZ/6/PASTOR	7996	8	144	100	182	108	50	A	***
17	OASIS/SKAUZ//4*BCN/3/2*PASTOR	8067	5	145	106	167	111	70	A	***
18	DVERD_2/AE.SQUARROSA (221)/3/URES/BOW//OPATA/4/TILHI	7606	13	137	103	152	112	60	A	***
19	TUKURU//BAV92/RAYON	6585	34	118	97	151	119	50	A	
20	TUKURU//BAV92/RAYON	7585	15	136	100	150	116	62	A	***
21	SUNSU/CHIBIA	7534	17	136	104	152	113	60	A	***+
22	KAUZ/PASTOR//PBW343	6685	33	120	103	152	103	65	A	**
23	WBL1*2/4/YACO/PBW65/3/KAUZ*2/TRAP//KAUZ	7433	20	134	100	152	120	55	A	**
24	WBL1*2/KIRITATI	7108	28	128	106	150	97	75	A	**
25	V-03079(CIMMYT material)	6809	29	123	97	149	115	80	A	
26	URES/JUN//KAUZ	7994	9	144	97	150	106	50	A	
27	4770/Barani-83	7406	21	133	98	148	119	50	A	***
28	SEHER-2006.cultivar in Pax	7600	14	137	99	149	119	60	A	***
29	ATAILLA	7727	12	139	104	149	117	70	A	**
30	WBL1*2/TUKURU	7205	26	130	101	149	132	55	A	***
31	REH/HARE//2*BCN/3/CROC_1/AE.SQUARROSA (213)//PGO/4/HUITES	8033	6	145	96	158	107	60	A	***
32	SERI.1B*2/3/KAUZ*2/BOW//KAUZ	7568	16	136	96	153	121	80	A	***

33	Parus/Pastor	6711	32	121	103	152	125	55	A	***
34	PASTOR/3/VORONA/CNO79//KAUZ	7888	10	142	105	151	116	50	A	***
35	SERI*3//RL6010/4*YR/3/FASTOR/4/BAV92	7750	11	139	98	165	116	50	R	***
36	TUKURU/PASTOR	8215	3	148	104	156	117	60	A	***
37	SKAUZ/Bav92	7313	23	132	103	151	121	70	A	***
38	CHECK ( Amu-99)	5557	36	Check	106	158	121	45	A	

Mean		7321			102	155	114	61		
Max		9045			114	182	132	80		
Min		4714			96	148	96	45		
EMS		339337.0			1.4	43.3	0.0	5.0		
LSD0.05		1204.8			2.9	13.7	0.2	4.6		
F (Prob)		0			0	0.001	0	0		
CV %		8			1	4	0	4		

**Table 32: Yield performance and other traits of 38 wheat genotypes tested in the NUT in 2008-2009 at Nangarhar, Afghanistan**

Entry No.	Variety Name/Pedigree	Grain Yield			Days to		Plant Height (cm)	LOD	1000 GWT	YR	SEL
		Kg/ha	Rank	% of Check	Heading	Maturity					
1	MILAN/OTUS//ATTILA/3*BCN	3928	31	95	110	155	100	20	40	0	*
2	OASIS/SKAUZ//4*BCN/3/2*PASTOR	4205	22	101	108	154	105	30	40	0	
3	BABAX/LR42//BABAX*2/3/VIVITSI	4412	18	106	108	156	105	30	40	20MR	
4	HPO/TAN/VEE/3/2*PGO/4/MILAN/5/SSEI	4528	14	109	107	156	110	30	40	0	*
5	IRENA/WEAVER	4462	17	108	116	157	105	20	32	0	
6	PrI/2*Pastor	4495	16	108	119	160	110	0	28	0	
7	CROC_1/AE.SQUARROSA (205)//KAUZ/3/ATTILA	4068	28	98	114	158	105	50	40	0	
8	CDNO/R143//ENTE/MEXI	3534	36	85	111	158	110	80	32	40S	
9	SERI/RAYON	2615	38	63	109	158	110	10	32	100S	
10	HD2687	3896	32	94	109	158	100	0	40	100S	
11	HPO/TAN//VEE/3/2*PGO/4/MILAN/5/SSEI	4015	29	97	107	153	100	20	40	0	*
12	KAUZ//ALTAR 84/AOS/3/MILAN/KAUZ/4/HUITES	5035	6	121	108	155	100	30	40	0	*
13	KAUZ//ALTAR 84/AOS/3/MILAN/KAUZ/4/HUITES	4194	23	101	108	157	105	40	36	0	*
14	WEAVER/3/SAPI/TEAL//HUI/4/CROC_1/AE.SQUARROSA(213)//PGO/5/SKAUZ*2/SRMA	3970	30	96	110	156	100	40	32	0	
15	CS/TH.SC//3*PVN/3/MIRLO/BUC/4/MILAN/5/TILHI	4742	13	114	106	155	95	5	40	100S	
16	CAL/NH/H567.71/3/SERI/4/CAL/NH/H567.71/5/2*KAUZ/6/PASTOR	5112	5	123	109	157	105	0	40	0	***
17	OASIS/SKAUZ//4*BCN/3/2*PASTOR	4778	12	115	111	157	110	30	36	0	**
18	DVERD_2/AE.SQUARROSA (221)/3/URES/BOW//OPATA/4/TILHI	4306	20	104	108	156	110	80	40	0	
19	TUKURU//BAV92/RAYON	3796	34	91	107	157	110	80	36	0	*
20	TUKURU//BAV92/RAYON	3749	35	90	108	157	110	80	36	0	*
21	SUNSU/CHIBIA	4144	26	100	109	157	110	80	40	0	*
22	KAUZ/PASTOR//PBW343	4902	8	118	110	157	105	0	40	0	*
23	WBLI*2/4/YACO/PBW65/3/KAUZ*2/TRAP//KAUZ	5489	3	132	106	157	115	0	44	20MR	
24	WBLI*2/KIRITATI	3846	33	93	106	156	100	0	36	60S	
25	V-03079(CIMMYT material)	4212	21	101	106	153	105	0	39	0	
26	URES/JUN//KAUZ	5015	7	121	108	153	105	0	40	0	
27	4770/Barani-83	4137	27	100	108	154	105	0	40	40S	
28	SEHER-2006.cultivar in Pax	4782	11	115	106	154	100	0	44	0	
29	ATAILLA	4354	19	105	108	156	105	0	40	40S	
30	WBLI*2/TUKURU	5601	2	135	108	156	120	0	44	0	**
31	REH/HARE//2*BCN/3/CROC_1/AE.SQUARROSA (213)//PGO/4/HUITES	5269	4	127	106	156	105	5	44	0	*
32	SERI.1B*2/3/KAUZ*2/BOW//KAUZ	6183	1	149	107	156	115	20	44	0	*

33	Parus/Pastor	4497	15	108	108	156	115	0	40	0	
34	PASTOR/3/VORONA/CNO79//KAUZ	4846	9	117	107	156	115	0	40	0	
35	BABAX/LR42//BABAX	4166	24	100	107	156	105	0	28	0	
36	TUKURU/PASTOR	4835	10	116	111	156	110	0	36	0	
37	SERI*3//RL6010/4*YR/3/FASTOR/4/BAV92	3067	37	74	110	156	105	0	40	0	*
38	CHECK ( Solha 02 )	4151	25	Check	121	159	110	0	32	0	

Mean		4404			109		107				
Max		6183			121		120				
Min		2615			106		95				
EMS		262445			2.71107		1.31579				
LSD0.05		1121.7			3.7		2.3				
F (Prob)		0.001			0		0				
CV %		11.6			1.5		1.1				

**Table 33: Yield performance and other traits of 38 wheat genotypes tested in the NUT in 2008-2009 at Helmand, Afghanistan**

Entry No.	Variety	Grain Yield			Days to		Plant Height (cm)	1000 GWT	SEL
	Name/Pedigree	Kg/ha	Rank	% of Check	Heading	Maturity			
1	MILAN/OTUS//ATTILA/3*BCN	10255	11	97	101	162	94	54	
2	OASIS/SKAUZ//4*BCN/3/2*PASTOR	10254	12	97	90	159	98	58	
3	BABAX/LR42//BABAX*2/3/VIVITSI	8865	30	84	88	159	100	52	
4	HPO/TAN/VEE/3/2*PGO/4/MILAN/5/SSEI	5129	38	48	88	159	90	56	
5	IRENA/WEAVER	9185	26	87	101	163	96	43	
6	Prl/2*Pastor	9954	16	94	101	162	107	53	***
7	CROC_1/AE.SQUARROSA (205)//KAUZ/3/ATTILA	8702	32	82	101	159	92	49	***
8	CDNO/R143//ENTE/MEXI	10527	5	99	90	159	97	50	***
9	SERI/RAYON	10454	6	99	88	159	88	49	***
10	HD2687	9828	18	93	101	162	88	54	***
11	HPO/TAN//VEE/3/2*PGO/4/MILAN/5/SSEI	9516	23	90	88	162	91	56	
12	KAUZ//ALTAR 84/AOS/3/MILAN/KAUZ/4/HUITES	10451	7	98	90	162	84	55	
13	KAUZ//ALTAR 84/AOS/3/MILAN/KAUZ/4/HUITES	7881	37	74	88	162	97	48	
14	WEAVER/3/SAPI/TEAL//HUI/4/CROC_1/AE.SQUARROSA (213)//PGO/5/SKAUZ*2/SRMA	9161	27	86	101	159	98	49	
15	CS/TH.SC//3*PVN/3/MIRLO/BUC/4/MILAN/5/TILHI	9661	21	91	88	162	84	53	
16	CAL/NH//H567.71/3/SERI/4/CAL/NH//H567.71/5/2*KAUZ/6/PASTOR	10176	13	96	90	163	89	43	***
17	OASIS/SKAUZ//4*BCN/3/2*PASTOR	10036	15	95	101	159	103	44	***
18	DVERD_2/AE.SQUARROSA (221)/3/URES/BOW//OPATA/4/TILHI	8735	31	82	90	158	92	52	***
19	TUKURU//BAV92/RAYON	9036	29	85	88	163	104	59	
20	TUKURU//BAV92/RAYON	9910	17	93	88	164	98	62	***
21	SUNSU/CHIBIA	12145	1	114	90	162	100	50	***
22	KAUZ/PASTOR//PBW343	8280	36	78	101	159	92	57	
23	WBL1*2/4/YACO/PBW65/3/KAUZ*2/TRAP//KAUZ	9410	24	89	88	159	107	54	
24	WBL1*2/KIRITATI	9550	22	90	88	159	92	54	
25	V-03079(CIMMYT material)	9781	19	92	90	159	94	53	***
26	URES/JUN//KAUZ	10836	2	102	101	163	94	57	***
27	4770/Barani-83	9776	20	92	90	164	105	54	***
28	SEHER-2006.cultivar in Pax	10730	3	101	88	163	94	61	***
29	ATAILLA	8508	35	80	88	163	100	54	***
30	WBL1*2/TUKURU	10439	8	98	90	163	108	52	
31	REH/HARE//2*BCN/3/CROC_1/AE.SQUARROSA (213)//PGO/4/HUITES	9259	25	87	88	163	92	54	
32	SERI.1B*2/3/KAUZ*2/BOW//KAUZ	9064	28	85	90	163	96	58	

33	Parus/Pastor	8634	34	81	90	163	92	49	
34	PASTOR/3/VORONA/CNO79//KAUZ	8657	33	82	90	163	92	51	
35	SERI*3//RL6010/4*YR/3/FASTOR/4/BAV92	10052	14	95	90	163	87	50	
36	TUKURU/PASTOR	10282	9	97	90	163	97	52	***
37	SKAUZ/Bav92	10272	10	97	88	163	107	41	
38	CHECK ( Roshan-96)	10611	4	Check	90	163	102	56	***

Mean		9579			92	161	96	53	
Max		12145			101	164	108	62	
Min		5129			88	158	84	41	
EMS		1425130						38.8416	
LSD0.05		2741						13.529	
F (Prob)		0.1						0.397	
CV %		12.5						12	



Table34: Combine analyze Yield performance of National uniform yield trial (NUT) 08-09 at eight sites

Variety	Grain Yield Kabul			Grain Yield Nangarhar			Grain Yield Baghlan			Grain Yield Kunduz			Grain Yield Balkh			Grain Yield Takhar			Grain Yield Herat			Grain Yield Helmand			Across Mean		
	Entry No.	Kg/ha	Rank	% of Check	Kg/ha	Rank	% of Check	Kg/ha	Rank	% of Check	Kg/ha	Rank	% of Check	kg/ha	Rank	% of Check	Kg/ha	Rank	% of Check	Kg/ha	Rank	% of Check	Kg/ha	Rank	% of Check	Kg/ha	Rank
1	4525	19	97	3928	31	128	4877	27	78	4700	32	100	4625	15	111	6017	30	87	8005	7	109	10255	11	100	5867	20	105
2	4559	18	97	4205	22	137	5405	22	86	6302	1	134	4354	25	104	6430	28	93	8148	4	111	10254	12	100	6207	12	112
3	4902	11	105	4412	18	144	6950	2	111	5621	17	119	4934	4	118	8262	1	120	7116	27	97	8865	30	86	6383	6	115
4	4855	12	104	4528	14	148	4402	31	70	5199	21	110	3820	34	92	5966	31	86	5123	37	70	5129	38	50	4878	38	88
5	5347	4	114	4462	17	145	4083	35	65	4620	34	98	4358	24	104	7111	14	103	7242	25	99	9185	26	89	5801	26	104
6	5500	1	117	4495	16	147	4601	30	73	4724	30	100	4290	26	103	6519	26	94	6747	31	92	9954	16	97	5854	22	105
7	5090	7	109	4068	28	133	3974	36	63	4976	25	105	4470	18	107	7281	10	105	6362	35	87	8702	32	85	5615	31	101
8	4814	13	103	3534	36	115	4374	32	70	5715	13	121	4842	8	116	7717	6	112	6792	30	93	10527	5	102	6039	15	109
9	2800	35	60	2615	38	85	5181	23	83	5415	20	115	4787	10	115	6600	23	96	8871	2	121	10454	6	102	5841	24	105
10	3284	34	70	3896	32	127	6325	9	101	6199	2	131	4903	5	117	8111	2	117	9045	1	124	9828	18	96	6449	5	116
11	4324	24	92	4015	29	131	6497	7	104	5005	23	106	4238	28	102	5241	36	76	4714	38	64	9516	23	93	5444	35	98
12	5234	6	112	5035	6	164	4972	26	79	5138	22	109	4245	27	102	5878	33	85	7493	19	102	10451	7	102	6056	14	109
13	4453	22	95	4194	23	137	6306	11	101	4302	38	91	4663	14	112	6051	29	88	7337	22	100	7881	37	77	5648	29	102
14	4438	23	95	3970	30	129	5655	19	90	4778	29	101	4683	13	112	6719	21	97	7521	18	103	9161	27	89	5866	21	105
15	2226	37	48	4742	13	155	6188	15	99	5433	19	115	4805	9	115	5842	34	85	7297	24	100	9661	21	94	5774	27	104
16	4706	15	100	5112	5	167	6403	8	102	5622	16	119	5113	3	123	6530	24	95	7996	8	109	10176	13	99	6457	4	116
17	3926	30	84	4778	12	156	5432	21	87	5997	5	127	4869	7	117	7885	4	114	8067	5	110	10036	15	98	6374	7	115
18	5417	3	116	4306	20	140	3482	37	55	4927	28	104	5138	2	123	7209	12	104	7606	13	104	8735	31	85	5852	23	105
19	4468	20	95	3796	34	124	4761	28	76	5471	18	116	4726	12	113	7198	13	104	6585	34	90	9036	29	88	5755	28	103
20	4904	10	105	3749	35	122	4641	29	74	4986	24	106	4225	29	101	6723	20	97	7585	15	104	9910	17	96	5840	25	105
21	5437	2	116	4144	26	135	6730	5	107	5715	12	121	4776	11	114	7578	8	110	7534	17	103	12145	1	118	6757	1	122
22	3770	31	81	4902	8	160	5756	18	92	5767	8	122	3563	36	85	5443	35	79	6685	33	91	8280	36	81	5521	34	99
23	2658	36	57	5489	3	179	6716	6	107	5736	9	122	4401	21	105	7738	5	112	7433	20	102	9410	24	92	6198	13	111
24	1405	38	30	3846	33	125	6311	10	101	4939	27	105	3499	38	84	5222	37	76	7108	28	97	9550	22	93	5235	37	94
25	4191	28	89	4212	21	137	5007	25	80	4371	36	93	3570	35	86	6511	27	94	6809	29	93	9781	19	95	5557	33	100
26	4592	17	98	5015	7	164	4314	33	69	5724	11	121	4492	17	108	1995	38	29	7994	9	109	10836	2	105	5620	30	101
27	5267	5	112	4137	27	135	7110	1	113	5946	6	126	4458	19	107	6701	22	97	7406	21	101	9776	20	95	6350	8	114
28	4804	14	103	4782	11	156	5563	20	89	5624	15	119	4379	22	105	7068	15	102	7600	14	104	10730	3	104	6319	9	114
29	3766	32	80	4354	19	142	6247	13	100	5702	14	121	4553	16	109	6885	19	100	7727	12	106	8508	35	83	5968	16	107
30	4465	21	95	5601	2	183	6902	3	110	5829	7	124	4041	32	97	7346	9	106	7205	26	99	10439	8	102	6479	3	117
31	3377	33	72	5269	4	172	6013	16	96	6139	3	130	3509	37	84	5934	32	86	8033	6	110	9259	25	90	5942	18	107
32	4275	25	91	6183	1	202	6807	4	108	5730	10	121	4370	23	105	6523	25	94	7568	16	103	9064	28	88	6315	10	114
33	4250	27	91	4497	15	147	3088	38	49	4307	37	91	4007	33	96	7624	7	110	6711	32	92	8634	34	84	5390	36	97
34	5069	8	108	4846	9	158	5024	24	80	4579	35	97	4419	20	106	7222	11	105	7888	10	108	8657	33	84	5963	17	107
35	5012	9	107	4166	24	136	5847	17	93	6104	4	129	5181	1	124	7945	3	115	7750	11	106	10052	14	98	6507	2	117

36	4252	26	91	4835	10	158	6227	14	99	4688	33	99	4902	6	117	7028	16	102			10282	9	100	6303	11	113	
37	4684	16	100	3067	37	100	6274	12	100	4719	31	100	4173	30	100	6907	17	100	7313	23	100	10272	10	100	5926	19	107
38	4059	29	Check	4151	25	Check	4166	34	Check	4941	26	Check	4110	31	Check	6892	18	100	5557	36	Check				5561	32	Check

Mean	4345			4404			5489			5308			4434			6680			7321			9579			5945		
Max	5500			6183			7110			6302			5181			8262			9045			12145			6757		
Min	1405			2615			3088			4302			3499			1995			4714			5129			4878		
EMS	594539			262445			1.15E+06			224373			123455			422340			339337.0			1425130					
LSD0.05	1741.107			1121.7			2176.131			1064			802.98			1442.04			1204.8			2741					
F (Prob)	0.007			0.001			0.025			0.002			0.001			0			0			0.1					
CV %	18			11.6			19.6			8.9			8			10			8			12.5					

## **NUT Rain Fed**

### **Materials and methods**

This study was conducted at Takhar, and Herat under normal and rain fed conditions respectively, using a set of advanced wheat genotypes obtained from NARC, 14<sup>th</sup> SPWY and 15<sup>th</sup> SAWYT and two commercial varieties, Lalmi 02 and Ghori 96 as check, at both the locations. The trials were planted in December 2008.

Individual experimental plots of 6.0 m<sup>2</sup> were seeded in six rows, 5m length with 0.20-m row spacing. Fertilizer was mixed into the soil prior to seeding as recommended for the area. The experimental plots were hand-weeded as necessary at individual sites. The other trial management practices were consistent with good crop husbandry recommended in the region.

Days to heading was recorded when spikes of approximately 50% of the plants in a plot were fully emerged. At maturity, plant height in each plot was measured from ground level to the tip of the spikes. Plants were hand-harvested at the ground level from the middle 4 m<sup>2</sup> in each plot. After threshing, grain weight and color were recorded.

Analysis of variance was conducted to determine difference among the genotype for grain yield and agronomic traits. The experimental genotypes were also compared with the commercial varieties to determine their relative performance.

### **Results and discussion**

The grain yield of 18 genotypes across sites ranged from 5609 to 7381 with across site mean of 6452 Kg/ha. Analysis of variance showed no variation among genotypes at any of the sites. The entry # 16 and 4 yielded higher than the check used.

### **Conclusion:**

Entry # 3, 4, 10, 14, 16, 17, 18, 19 and 20 were found promising and advanced for testing in the future.

Table 35: Mean values for yield and other traits of the wheat genotypes tested in the NUT-RF in 2008-2009 at Takhar, Afghanistan

Entry No.	Variety Name/Pedigree	Grain Yield			Days to		Plant Height (cm)	Field Selection
		kg/ha	Rank	% of Check	Heading	Maturity		
1	PASTOR/OPATA	8244	10	98	111	142	116	
2	PR2/2*PASTOR	7368	20	88	105	125	100	
3	W-3918/JUP	8245	9	98	113	127	95	
4	WQLAB91*/TUKURU	8852	2	106	105	127	120	
5	PASTOR/OPATA/3/BOW/PRL//BUL	7861	17	94	106	125	119	
6	JUN"S"/BB/2/KAL/PVN"S"PB-2BT-IBT.....	8134	11	97	106	126	124	
7	PS-85//BOW"S"/BUL"S"	8256	7	98	106	125	117	
8	Ghori 96	7523	19	90	106	125	114	
9	VEE#8//JUP/BJY/3/F3.71/TRM/4/BCN/5/KAUZ/6/PASTOR/7/PASTOR	8066	13	96	110	126	105	
10	KS940935.7.1.2/2*PASTOR	8246	8	98	106	125	106	
11	BJY/COC//PRL/BOW/3/SARA/THB//VEE/4/PIFED	8035	15	96	109	128	120	
12	WORRAKATTA/2*PASTOR	7659	18	91	108	125	114	
13	OASIS/KAUZ//4*BCN/3/WBLL1	8039	14	96	109	126	106	
14	TIE CHUAN 1*2/3/HE1/3*CNO79//2*SERI	8701	3	104	110	128	120	
15	ALTAR 84/AEIGIOPS SQUARROSA (TAUS)//OPATA/3/ATTILA	7946	16	95	112	126	111	
16	CROC_1/AE.SQUARROSA (205)//BORL95/3/KENNEDY	8401	4	100	107	125	106	
17	QT6581/4/PASTOR//SITE/MO/3/CHEN/AEIGIOPS SQUARROSA (TAUS)//BCN	8075	12	96	109	125	98	
18	CHAM6/ATTILA//PASTOR	8297	6	99	106	127	103	
19	CHIBIA/5/CNDO/R143//ENTE/MEXI 2/3/AEIGIOPS SQUARROSA (TAUS)/4/WEAVER	9167	1	109	55	64	55	
20	Local Check ( Lalmi 2 )	8384	5	100	113	128	98	
Mean		8175			106	124	107	
Max		9167			113	142	124	
Min		7368			55	64	55	
EMS		657839			309.389	423.236	308.12	
LSD0.05		1744.954			36.816	43.054	36.733	
F (Prob)		0.949			0.544	0.491	0.209	
CV %		10			17	17	16	

**Table 36: Mean values for yield and other traits of the wheat genotypes tested in the NUT-RF in 2008-2009 at Herat, Afghanistan**

Entry No.	Variety	Grain Yield			Days to		Plant Height (cm)	1000 GWT	Colour	SEL
	Name/Pedigree	Kg/ha	Rank	% of Check	Heading	Maturity				
1	PASTOR/OPATA	3943	18	78	124	169	91	40	A	.
2	PR2/2*PASTOR	4871	11	96	123	168	80	50	A	**
3	W-3918/JUP	5171	4	102	130	169	77	50	A	**
4	WQLAB91*/TUKURU	4683	14	92	124	171	89	50	A	***
5	PASTOR/OPATA/3/BOW/PRL//BUL	4903	10	97	129	169	103	45	A	***
6	JUN"S"/BB/2/KAL/PVN"S"PB-2BT-IBT.....	3084	20	61	125	171	111	40	A	***
7	PS-85//Bow "S"/BUL "S"	3915	19	77	125	169	106	45	A	***
8	CHIBIA/5/CNOO/R143//ENTE/MEX2 3/.....	4315	17	85	130	171	86	40	W	***
9	VEE#8//JUP/BJY/3/F3.71/TRM/4/BCN/5/KAUZ/6/PASTOR/7/PASTOR	4777	13	94	125	169	90	35	A	***
10	KS940935.7.1.2/2*PASTOR	5448	1	107	126	169	93	45	R	**
11	BJY/COC//PRL/BOW/3/SARA/THB//VEE/4/PIFED	4547	15	90	129	171	107	45	A	***
12	WORRAKATTA/2*PASTOR	4854	12	96	131	171	95	45	A	***
13	OASIS/SKAUZ//4*BCN/3/WBLL1	4478	16	88	125	171	90	45	A	***
14	TIE CHUAN 1*2/3/HE1/3*CNO79//2*SERI	5022	6	99	133	173	106	50	R	**
15	ALTAR 84/AEGILOPS SQUARROSA (TAUS)//OPATA/3/ATTILA	4913	9	97	129	173	100	50	A	**
16	CROC 1/AE.SQUARROSA (205)//BORL95/3/KENNEDY	5255	3	104	122	169	86	50	A	***
17	QT6581/4/PASTOR//SITE/MO/3/CHEN/AEGILOPS SQUARROSA (TAUS)//BCN	4948	8	97	125	167	83	40	A	**
18	CHAM6/ATTILA//PASTOR	4980	7	98	122	171	89	35	A	.
19	CHIBIA/5/CNDO/R143//ENTE/MEXI 2/3/AEGILOPS SQUARROSA (TAUS)/4/WEAVER	5394	2	106	125	169	86	40	R	**
20	Local Check ( Ghoris 96 )	5077	5	100	123	173	88	60	A	**
Mean		4729			126	170	93	45		
Max		5448			133	173	111	60		
Min		3084			122	167	77	35		
EMS		276000			0.9					
LSD0.05		1231.745			1.986					
F (Prob)		0.113			0					
CV %		11			1					

Table37: Across Mean of NUT-RF in Two locations 2008-2009

Variety		Grain Yield Takhar			Grain Yield Herat			Across Mean		
Entry No.	Name/Pedigree	kg/ha	Rank	% of Check	Kg/ha	Rank	% of Check	Kg/ha	Rank	% of Check
1	PASTOR/OPATA	8244	10	98	3943	18	78	6093	17	91
2	PR2/2*PASTOR	7368	20	88	4871	11	96	6120	16	91
3	W-3918/JUP	8245	9	98	5171	4	102	6708	7	100
4	WQLAB91*/TUKURU	8852	2	106	4683	14	92	6767	5	101
5	PASTOR/OPATA/3/BOW/PRL/BUL	7861	17	94	4903	10	97	6382	12	95
6	JUN"S"/BB/2/KAL/PVN"S"PB-2BT-IBT.....	8134	11	97	3084	20	61	5609	20	83
7	PS-85//BOW"S"/BUL"S"	8256	7	98	3915	19	77	6086	18	90
8	Check (Various)	7523	19	90	4315	17	85	5919	19	88
9	VEE#8//JUP/BJY/3/F3.71/TRM/4/BCN/5/KAUZ/6/PASTOR/7/PASTOR	8066	13	96	4777	13	94	6422	11	95
10	KS940935.7.1.2/2*PASTOR	8246	8	98	5448	1	107	6847	3	102
11	BJY/COC//PRL/BOW/3/SARA/THB//VEE/4/PIFED	8035	15	96	4547	15	90	6291	13	93
12	WORRAKATTA/2*PASTOR	7659	18	91	4854	12	96	6257	15	93
13	OASIS/SKAUZ//4*BCN/3/WBLL1	8039	14	96	4478	16	88	6259	14	93
14	TIE CHUAN 1*2/3/HE1/3*CNO79//2*SERI	8701	3	104	5022	6	99	6861	2	102
15	ALTAR 84/AEGILOPS SQUARROSA (TAUS)//OPATA/3/ATTILA	7946	16	95	4913	9	97	6430	10	96
16	CROC_1/AE.SQUARROSA (205)//BORL95/3/KENNEDY	8401	4	100	5255	3	104	6828	4	101
17	QT6581/4/PASTOR//SITE/MO/3/CHEN/AEGILOPS SQUARROSA (TAUS)//BCN	8075	12	96	4948	8	97	6511	9	97
18	CHAM6/ATTILA//PASTOR	8297	6	99	4980	7	98	6638	8	99
19	CHIBIA/5/CNDO/R143//ENTE/MEXI_2/3/AEGILOPS SQUARROSA (TAUS)/4/WEAVER	9167	1	109	5394	2	106	7281	1	108
20	Local Check ( Various )	8384	5	100	5077	5	100	6730	6	100

Mean		8175			4729			6452		
Max		9167			5448			7281		
Min		7368			3084			5609		
EMS		657839			276000					
LSD0.05		1744.954			1231.745					
F (Prob)		0.949			0.113					
CV %		10			11					

Table 38: AYT –IRR at Kabul Darulaman2008/2009

Entry No.	Variety Name/ Pedigree	Grain Yield			Days to		Plant Height (cm)	% of Stand	1000 GWT.	G.Color	YR	SEL
		kg/ha	Rank	% of Check	Heading	Maturity						
1	CS/TH.SC//3*PVN3/MIRLO/BUC4/MILAN/5/TILHI	3707	10	140	134	170	77	56	44	LA	TR	**
2	REH/HARE//2*BCN3/CROC_1/AE.SUARROSA (213)//PGO/4/HUITES	4150	4	156	134	173	88	62	36	LA	80S	
3	PBW65/2*PASTOR	4528	1	170	135	174	80	59	36	A	5R	*
4	PFAU/SERI.1B//AMAD/3/ATTILA*2/STAR	4013	5	151	133	171	83	57	28	A	60MS	
5	PASTOR/3/KAUZ*2/OPATA//KAUZ(Ariana07)	2957	19	111	140	176	77	44	44	A	10R	
6	OASIS/KAUZ//4*BAC*2/3/PASTOR	4454	2	168	138	177	79	49	28	A	0	
7	Fiscal	2558	25	96	139	179	83	52	32	R	0	*
8	Yubileinaya75/3/Agri/Bjy//Vec/4/Pyn/Bau	3328	14	125	138	178	74	57	24	A	60MS	
9	WEAVER/4/NAC/TH.AC//3*PVN3/MIRLO/BUC	3773	8	142	141	180	79	52	36	LD	10R	*
10	PASTOR/3/VORONA/CNO79//KAUZ	3715	9	140	139	179	83	57	32	LD	0	
11	PASTOR/3/VORONA/CNO79//KAUZ	3540	13	133	139	173	89	63	32	A	20MR	
12	CROC_1/AE. SQ. (224)//OPATA/3/KAUZ*2/BOW//KAUZ/4/NL 683	3633	12	137	139	177	83	63	28	LA	10MR	*
13	KETUPA*2/PASTOR	3107	17	117	139	176	79	64	36	LR	40MS	
14	URES/BOW//OPATA/3/PASTOR	2821	22	106	138	177	84	50	32	A	100S	
15	AKULA/5/GOV/AZ//MUS/3/DODO/4/BOW	2957	20	111	141	179	91	66	28	LR	60S	
16	KAUZ/MILAN/3/CROC_1/AE.SUARROSA (205)//KAUZ	4008	6	151	139	179	79	63	40	LR	40S	
17	CAL/NH//H567.71/3/SERI/4/CAL/NH//H567.71/5/2*KAUZ/6/PASTOR	4181	3	157	135	179	84	59	44	RL	40MR	
18	CS/TH.SC//3*PVN3/MIRLO/BUC4/PASTOR	2884	21	109	137	179	76	46	28	A	0	*
19	WEAVER/3/KAUZ*2/BOW//KAUZ	3666	11	138	140	178	79	55	32	LR	0	
20	KAUZ/PASTOR//BAV92/RAYON	3774	7	142	136	177	74	51	40	A	5R	
21	FRET2*2/4/SNI/TRAP#1/3/KAUZ*2/TRAP//KAUZ	3229	15	122	134	178	89	43	40	A	5R	
22	Croc-1-/AE.SQUROSS//KAUZ/3/AT/LH	3028	18	114	135	179	72	54	36	A	60S	
23	KAUZ/PASTOR	3139	16	118	137	177	61	55	32	A	0	*
24	KT/BAGE//FNU/3/CH-86	2669	23	100	136	180	72	56	40	A	0	*
25	Local Check ( Solh-2)	2657	24	Check	138	179	81	51	40	A	5R	

Mean		3459			137	177	80	55	35			
Max		4528			141	180	91	66	44			
Min		2558			133	170	61	43	24			
EMS		335420			1.07	0.95	12.02	38.50				
LSD0.05		1367.7			2.2	2.2	8.4	14.2				
F (Prob)		0.185			0	0	0	0.189				
CV %		17			1	1	4	11				



Table 39: AYT –IRR at Kunduz Central Farm 2008/2009

Entry No.	Variety Name/ Pedigree	Grain Yield			Days to		Plant Height (cm)	Lodging	% of Stand	Field Selection
		kg/ha	Rank	% of Check	Heading	Maturity				
1	CS/TH.SC//3*PVN/3/MIRLO/BUC/4/MILAN/5/TILHI	9860	3	111	102	101	89	10	94	
2	REH/HARE//2*BCN/3/CROC_1/AE.SQUARROSA (213)/PGO/4/HUITES	9877	2	112	101	101	85	50	95	
3	PBW65/2*PASTOR	8607	17	97	99	99	100	85	97	
4	PFAU/SERI.1B//AMAD/3/ATTILA*2/STAR	9016	12	102	99	98	91	70	96	
5	PASTOR/3/KAUZ*2/OPATA//KAUZ	10719	1	121	106	106	87	0	95	
6	OASIS/KAUZ//4*BAC*2/3/PASTOR	9032	11	102	104	105	93	60	97	
7	Fiscal	9641	6	109	104	105	98	50	97	
8	Yubileinaya75/3/Agri/Bjy//Vec/4/Pyn/Bau	8829	15	100	105	106	94	90	97	
9	WEAVER/4/NAC/TH.AC//3*PVN/3/MIRLO/BUC	8049	23	91	105	106	93	5	95	
10	PASTOR/3/VORONA/CNO79//KAUZ	8750	16	99	106	106	95	60	95	
11	PASTOR/3/VORONA/CNO79//KAUZ	8179	22	92	105	106	92	35	96	
12	CROC_1/AE. SQ. (224)//OPATA/3/KAUZ*2/BOW//KAUZ/4/NL 683	8938	13	101	103	104	96	50	98	
13	KETUPA*2/PASTOR	9344	9	106	104	104	97	35	96	
14	URES/BOW//OPATA/3/PASTOR	8257	20	93	103	102	93	30	93	
15	AKULA/5/GOV/AZ//MUS/3/DODO/4/BOW	8438	19	95	108	108	98	20	95	
16	KAUZ/MILAN/3/CROC_1/AE.SQUARROSA (205)//KAUZ	7632	24	86	106	106	93	0	92	
17	CAL/NH//H567.71/3/SERI/4/CAL/NH//H567.71/5/2*KAUZ/6/PASTOR	9741	4	110	103	103	83	30	93	
18	CS/TH.SC//3*PVN/3/MIRLO/BUC/4/PASTOR	8250	21	93	101	101	94	80	96	
19	WEAVER/3/KAUZ*2/BOW//KAUZ	7439	25	84	104	102	90	65	93	
20	KAUZ/PASTOR//BAV92/RAYON	9375	8	106	102	103	88	20	91	
21	FRET2*2/4/SNI/TRAP#1/3/KAUZ*2/TRAP//KAUZ	9203	10	104	99	99	105	95	95	
22	Croc-1-/AE.SQUROSS//KAUZ/3/AT/LH	8511	18	96	101	102	91	65	97	
23	KAUZ/PASTOR	9532	7	108	103	103	83	0	95	
24	KT/BAGE//FNU/3/CH-86	9683	5	109	100	101	88	5	97	
25	Local Check ( Solh-2)	8844	14	Check	104	105	97	75	96	

Mean		8950			103	103	93	43	95	
Max		10719			108	108	105	95	98	
Min		7439			99	98	83	0	91	
EMS		555392			0.903297		31.3297	573	3.32102	
LSD0.05		1538.017			2.136		11.919	49.41	3.932	
F (Prob)		0.034			0		0.079	0.003	0.135	
CV %		8			1	0	6	55	2	

Table 40: AYT –IRR at Nangarhar (Shishambagh) Research station 2008/2009

Entry No.	Variety Name/Pedigree	Grain Yield			Days to		Plant Height (cm)	Stand %	1000 GWT.	Lodging %	Field Selection
		Kg/ha	Rank	% of Check	Heading	Maturity					
1	CS/TH.SC/3*PVN/3/MIRLO/BUC/4/MILAN/5/TILHI	6883	3	119	111	153	90	95	38	5	
2	REH/HARE//2*BCN/3/CROC_1/AE.SUARROSA (213)//PGO/4/HUITES	5167	18	90	108	153	95	96	35	40	
3	PBW65/2*PASTOR	6984	2	121	108	152	105	96	37	50	
4	PFAU/SERI.1B//AMAD/3/ATILIA*2/STAR	5528	14	96	106	152	115	95	42	60	
5	PASTOR/3/KAUZ*2/OPATA//KAUZ	8050	1	139	115	154	115	93	39		
6	OASIS/KAUZ//4*BAC*2/3/PASTOR	4919	20	85	113	155	105	95	35	60	
7	Fiscal	5414	16	94	113	155	110	93	32	10	
8	Yubileinaya75/3/Agri/Bjy//Vee/4/Pyn/Bau	3490	25	60	121	156	105	95	27	60	
9	WEAVER/4/NAC/TH.AC//3*PVN/3/MIRLO/BUC	5845	10	101	114	155	105	94	38	50	
10	PASTOR/3/VORONA/CNO79//KAUZ	6147	7	106	113	155	110	95	38.5	50	
11	PASTOR/3/VORONA/CNO79//KAUZ	6695	5	116	113	155	110	95	37		
12	CROC_1/AE. SQ. (224)//OPATA/3/KAUZ*2/BOW//KAUZ/4/NL 683	4744	22	82	112	154	100	94	33	5	
13	KETUPA*2/PASTOR	6104	8	106	109	154	100	96	39		
14	URES/BOW//OPATA/3/PASTOR	5543	13	96	113	155	105	95	37	30	
15	AKULA/5/GOV/AZ//MUS/3/DODO/4/BOW	4085	24	71	118	155	110	96	33	5	
16	KAUZ/MILAN/3/CROC_1/AE.SUARROSA (205)//KAUZ	5297	17	92	111	155	95	94	40		
17	CAL/NH//H567.71/3/SERI/4/CAL/NH//H567.71/5/2*KAUZ/6/PASTOR	6680	6	116	112	155	100	92	42		
18	CS/TH.SC//3*PVN/3/MIRLO/BUC/4/PASTOR	5441	15	94	111	154	100	94	34	5	
19	WEAVER/3/KAUZ*2/BOW//KAUZ	4155	23	72	111	154	100	92	37	20	
20	KAUZ/PASTOR//BAV92/RAYON	4818	21	83	111	153	100	96	35		
21	FRET2*2/4/SNI/TRAP#1/3/KAUZ*2/TRAP//KAUZ	6075	9	105	108	152	105	96	36	5	
22	Croc-1/AE.SQUROSS//KAUZ/3/AT/LH	4955	19	86	111	154	100	96	40	40	
23	KAUZ/PASTOR	5840	11	101	110	152	90	94	33		
24	KT/BAGE//FNU/3/CH-86	6766	4	117	105	153	95	93	42		
25	Local Check ( Solh-2)	5772	12	100	121	158	110	90	35		

Mean		5656			112	154	103	94			
Max		8050			121	158	115	96			
Min		3490			105	152	90	90			
EMS		796692			2.64381	1.98812		1.18446			
LSD0.05		2007.141			3.748	2.966		2.466			
F (Prob)		0.02			0	0.043		0.005			
CV %		16			1	1		1			

Table 41: Combine analyze of .AYT –IRR at three site 2008/2009

Variety		Grain Yield Kabul			Grain Yield Kunduz			Grain Yield Nangarhar			Across Mean		
Entry No.	Name/ Pedigree	kg/ha	Rank	% of Check	kg/ha	Rank	% of Check	Kg/ha	Rank	% of Check	Kg/ha	Rank	% of Check
1	CS/TH.SC//3*PVN/3/MIRLO/BUC/4/MILAN/5/TILHI	3707	10	140	9860	3	111	6883	3	119	6817	3	118
2	REH/HARE//2*BCN/3/CROC_1/AE.SQUARROSA (213)/PGO/4/HUITES	4150	4	156	9877	2	112	5167	18	90	6398	5	111
3	PBW65/2*PASTOR	4528	1	170	8607	17	97	6984	2	121	6706	4	116
4	PFAU/SERI.1B//AMAD/3/ATTILA*2/STAR	4013	5	151	9016	12	102	5528	14	96	6186	8	107
5	PASTOR/3/KAUZ*2/OPATA//KAUZ	2957	19	111	10719	1	121	8050	1	139	7242	1	126
6	OASIS/KAUZ//4*BAC*2/3/PASTOR	4454	2	168	9032	11	102	4919	20	85	6135	13	107
7	Fiscal	2558	25	96	9641	6	109	5414	16	94	5871	16	102
8	Yubileinaya75/3/Agri/Bjy//Vee/4/Pyn/Bau	3328	14	125	8829	15	100	3490	25	60	5216	23	91
9	WEAVER/4/NAC/TH.AC//3*PVN/3/MIRLO/BUC	3773	8	142	8049	23	91	5845	10	101	5889	15	102
10	PASTOR/3/VORONA/CNO79//KAUZ	3715	9	140	8750	16	99	6147	7	106	6204	7	108
11	PASTOR/3/VORONA/CNO79//KAUZ	3540	13	133	8179	22	92	6695	5	116	6138	12	107
12	CROC_1/AE. SQ. (224)//OPATA/3/KAUZ*2/BOW//KAUZ/4/NL 683	3633	12	137	8938	13	101	4744	22	82	5771	17	100
13	KETUPA*2/PASTOR	3107	17	117	9344	9	106	6104	8	106	6185	9	107
14	URES/BOW//OPATA/3/PASTOR	2821	22	106	8257	20	93	5543	13	96	5540	20	96
15	AKULA/5/GOV/AZ//MUS/3/DODO/4/BOW	2957	20	111	8438	19	95	4085	24	71	5160	24	90
16	KAUZ/MILAN/3/CROC_1/AE.SQUARROSA (205)//KAUZ	4008	6	151	7632	24	86	5297	17	92	5646	19	98
17	CAL/NH//H567.71/3/SERI/4/CAL/NH//H567.71/5/2*KAUZ/6/PASTOR	4181	3	157	9741	4	110	6680	6	116	6867	2	119
18	CS/TH.SC//3*PVN/3/MIRLO/BUC/4/PASTOR	2884	21	109	8250	21	93	5441	15	94	5525	21	96
19	WEAVER/3/KAUZ*2/BOW//KAUZ	3666	11	138	7439	25	84	4155	23	72	5087	25	88
20	KAUZ/PASTOR//BAV92/RAYON	3774	7	142	9375	8	106	4818	21	83	5989	14	104
21	FRET2*2/4/SNI/TRAP#1/3/KAUZ*2/TRAP//KAUZ	3229	15	122	9203	10	104	6075	9	105	6169	11	107
22	Croc-1/AE.SQUROSS//KAUZ/3/AT/LH	3028	18	114	8511	18	96	4955	19	86	5498	22	95
23	KAUZ/PASTOR	3139	16	118	9532	7	108	5840	11	101	6170	10	107
24	KT/BAGE//FNU/3/CH-86	2669	23	100	9683	5	109	6766	4	117	6373	6	111
25	Local Check ( Solh-2)	2657	24	Check	8844	14	Check	5772	12	100	5758	18	100

Mean		3459			8950			5656			6021		
Max		4528			10719			8050			7242		
Min		2558			7439			3490			5087		
EMS		335420			555392			796692					
ESD0.05		1367.7			1538.017			2007.141					
F (Probe)		0.185			0.034			0.02					
CV %		17			8			16					

Table 42: AYT-RF at Takhar (Bagh-e-Zakhira Research station) 2008/2009

Entry No.	Variety Name/Pedigree	Grain Yield			Days to		Plant Height (cm)	Field Selection
		kg/ha	Rank	% of Check	Heading	Maturity		
1	ALTAR 84/AEGILOPS SQUARROSA (TAUS)//OPATA/3/2*PJN/BOW//OPATA	6483	8	88	111	156	116	
2	CHAM6/ATTILA//PASTOR	5287	16	72	113	157	103	
3	PASTOR//TODY/BAU/3/PASTOR	6975	3	95	116	159	109	
4	WORRAKATTA/PASTOR	6562	7	89	112	158	105	
5	TAM200/TUI//MILAN/KAUZ/3/BABAX	6282	9	85	111	158	99	
6	CHIBIA/5/CNDO/R143//ENTE/MEXI_2/3/AEGILOPS SQUARROSA (TAUS)/4/WEAVER	5185	18	70	116	158	104	
7	WBLI*2/KUKUNA	5696	13	77	110	156	99	
8	BABAX/PASTOR/3/KAUZ*2/YACO//KAUZ	6917	4	94	114	157	97	
9	PYN*2/CO725052/3/KAUZ*2/YACO//KAUZ	5947	11	81	112	155	116	
10	NWT/3/TAST/SPRW//TAW12399.75/6/SXL/VEE/4/ TJB916.46/CB//2MHB/3/BUC/5/1D13.1/MLT	6785	5	92	117	158	114	
11	SMB/HN4//SPN/3/WTS//YMH/HYS	5554	14	75	114	158	100	
12	VORONA/HD24-12//GUN	5189	17	71	111	155	97	
13	AU/CO652337//2*CA8155/3/F474S1-1.1	5833	12	79	113	156	103	
14	PUNJOB-96/Parwaz-94	5174	19	70	110	156	93	
15	PBW65/2*PASTOR	5980	10	81	111	155	106	
16	ARIANA07	4596	20	62	113	158	109	
17	LUAN/KOH-97	6636	6	90	110	157	111	
18	CALNG//H567.71/3/SERI/9/CAL/NH//H567.71/5/.....	7019	2	95	113	157	105	
19	VEE/PJN//2*TUI/3/PFAU/BOW/VEE#9/4/PASTOR	5382	15	73	112	156	83	
20	Local Check ( Lalmi 2 ):	7359	1	Check	114	156	111	

Mean	6042			113	157	104	
Max	7359			117	159	116	
Min	4596			110	155	83	
EMS	880478			3.88661	1.3564	48.4353	
LSD <sub>0.05</sub>	2149.5			4.4	2.8	16.4	
F (Prob)	0.368			0.087	0.196	0.023	
CV %	16			2	1	7	

Table43: AYT-RF at Herat (Urdo khan) research station 2008/2009

Entry No.	Variety Name/Pedigree	Grain Yield			Days to		Plant Height (cm)	1000 GWT	Colour	Selection
		kg/ha	Rank	% of Check	Heading	Maturity				
1	ALTAR 84/AEGILOPS SQUARROSA (TAUS)//OPATA/3/2*PJN/BOW//OPATA	4110	16	85	125	169	96	48	R	**
2	CHAM6/ATTILA//PASTOR	4999	7	104	123	170	88	40	A	**
3	PASTOR//TODY/BAU/3/PASTOR	4973	8	103	128	170	89	40	R	0
4	WORRAKATTA/PASTOR	4165	15	87	124	169	86	40	A	**
5	TAM200/TUI//MILAN/KAUZ/3/BABAX	6274	1	130	122	170	81	40	R	0
6	CHIBIA/5/CNDO/R143//ENTE/MEXI_2/3/AEGILOPS SQUARROSA (TAUS)/4/WEAVER	5101	5	106	130	167	97	36	R	***
7	WBLL1*2/KUKUNA	4495	12	93	117	167	93	44	R	***
8	BABAX/PASTOR/3/KAUZ*2/YACO//KAUZ	4253	14	88	123	169	93	40	R	***
9	PYN*2/CO725052/3/KAUZ*2/YACO//KAUZ	4085	17	85	125	169	115	32	A	***
10	NWT/3/TAST/SPRW//TAW12399.75/6/SXL/VEE/4/TJB916.46/CB//*2MHB/3/BUC/5/1D13.1/MLT	4393	13	91	129	171	121	40	R	***
11	SMB/HN4//SPN/3/WTS//YMH/HYS	3373	20	70	130	171	110	45	A	**
12	VORONA/HD24-12//GUN	4511	11	94	129	172	111	40	A	**
13	AU/CO652337//2*CA8155/3/F474S1-1.1	3659	19	76	129	173	110	32	A	**
14	NUT (Pak-LS) DA 2007-2008	5104	4	106	129	173	103	44	A	**
15	NUT (Pak-LS) DA 2007-2008	5060	6	105	125	172	91	44	A	0
16	NUT (Pak-LS) DA 2007-2008	5292	3	110	122	172	88	50	A	***
17	Ghori 96	4684	10	97	123	171	94	40	A	***
18	CAL/NG//H567.71/3/SERI/9/CAL/NH//H567.71/5/.....	5449	2	113	130	169	85	36	A	**
19	VEE/PJN//2*TUI/3/PFAU/BOW/VEE#9/4/PASTOR	3773	18	78	123	172	68	45	A	0
20	Local Check (Lalmi 3 )	4813	9	100	123	174	76	50	A	**
Mean		4628			125	171	95	41		
Max		6274			130	174	121	50		
Min		3373			117	167	68	32		
EMS		1469560					0.05			
LSD <sub>0.05</sub>		2580.70					0.455			
F (Prob)		0.863					0			
CV %		26					0			

Table 44: Across Mean of AYT-RF in two locations 2008-2009

Entry No.	Variety Name/Pedigree	Grain Yield Takhar			Grain Yield Herat			Across Mean		
		kg/ha	Rank	% of Check	kg/ha	Rank	% of Check	Kg/ha	Rank	% of Check
1	ALTAR 84/AEGILOPS SQUARROSA (TAUS)//OPATA/3/2*PJN/BOW//OPATA	6483	8	88	4110	16	85	5297	10	87
2	CHAM6/ATTILA//PASTOR	5287	16	72	4999	7	104	5143	12	85
3	PASTOR//TODY/BAU/3/PASTOR	6975	3	95	4973	8	103	5974	4	98
4	WORRAKATTA/PASTOR	6562	7	89	4165	15	87	5363	9	88
5	TAM200/TUI//MILAN/KAUZ/3/BABAX	6282	9	85	6274	1	130	6278	1	103
6	CHIBIA/5/CNDO/R143//ENTE/MEX1_2/3/AEGILOPS SQUARROSA (TAUS)/4/WEAVER	5185	18	70	5101	5	106	5143	11	85
7	WBLL1*2/KUKUNA	5696	13	77	4495	12	93	5095	14	84
8	BABAX/PASTOR/3/KAUZ*2/YACO//KAUZ	6917	4	94	4253	14	88	5585	7	92
9	PYN*2/CO725052/3/KAUZ*2/YACO//KAUZ	5947	11	81	4085	17	85	5016	15	82
10	NWT/3/TAST/SPRW//TAW12399.75/6/SXL/VEE/4/ TJB916.46/CB//*2MHB/3/BUC/5/1D13.1/MLT	6785	5	92	4393	13	91	5589	6	92
11	SMB/HN4//SPN/3/WTS//YMH/HYS	5554	14	75	3373	20	70	4464	20	73
12	VORONA/HD24-12//GUN	5189	17	71	4511	11	94	4850	17	80
13	AU/CO652337//2*CA8155/3/F474S1-1.1	5833	12	79	3659	19	76	4746	18	78
14	NUT (Pak-LS) DA 2007-2008	5174	19	70	5104	4	106	5139	13	84
15	NUT (Pak-LS) DA 2007-2008	5980	10	81	5060	6	105	5520	8	91
16	NUT (Pak-LS) DA 2007-2008	4596	20	62	5292	3	110	4944	16	81
17	Ghori 96	6636	6	90	4684	10	97	5660	5	93
18	AYT (spring planted) DA, 2007-2008 # 3	7019	2	95	5449	2	113	6234	2	102
19	AYT (spring planted)DA,2007-2008 #10	5382	15	73	3773	18	78	4578	19	75
20	Local Check ( Various )	7359	1	Check	4813	9	Check	6086	3	100
Mean		6042			4628			5335		
Max		7359			6274			6278		
Min		4596			3373			4464		
EMS		880478			1469560					
LSD0.05		2149.5			2580.70					
F (Prob)		0.368			0.863					
CV %		16			26					

**Table 45: AYT-STRRSN at Kabul (Darulaman research station) 2008/2009**

Entry No.	Variety Name/Pedigree	Grain Yield			Days to	Plant	1000 GWT.	Yellow Rust
		kg/ha	Rank	% of Check	Heading	Height (cm)		
1	WORRAKATTA/2*PASTOR	4737	11	83	131	96	35	0
2	C80.1/3*BATAVIA//2*WBLL1	5855	3	102	133	93	40	0
3	KAUZ*2/BOW//KAUZ/3/W98.6.38	4160	12	73	130	78	35	MIX
4	Local Check (Ariana 07)	5732	4	Check	134	93	40	Tr
5	SERI*3//RL6010/4*YR/3/PASTOR/4/BAV92	5188	6	91	132	93	41	Tr
6	SKAUZ/Bav92	5107	8	89	132	91	40	Tr
7	TUKURU/PASTOR	6545	1	114	134	95	36	0*
8	TAM200/PASTOR//TOBA97	5111	7	89	131	90	37	0
9	PGO/SERI//BAV92	3834	14	67	129	99	37	20Ms
10	TEMPORALERA M 87*2/4/HD2281/TRAP#1/3/KAUZ*2/TRAP//KAUZ	4851	10	85	132	104	37	20Ms
11	CHIL/CHUM18/4/BUC/BJY/3/CNDR/ANA//CNDR/MUS	4121	13	72	130	89	37	MIX
12	KAUZ//ALTAR 84/AOS/3/KAUZ/4/SW94.15464	3757	15	66	130	96	37	0
13	BABAX/LR42//BABAX	6495	2	113	134	91	37	20Ms
14	ESDA/LIRA//MILAN/3/VEE#5/SARA	5289	5	92	135	92	37	0
15	BUC/PRL//WEAVER/3/TUKURU	4965	9	87	136	94	37	10R*

Mean		5050			132	93		
Max		6545			136	104		
Min		3757			129	78		
EMS		201520			1.66804	19.1623		
LSD <sub>0.05</sub>		829.389			2.349	8.558		
F (Prob)		0			0	0.001		
CV %		9			1	5		



Table 46: AYT (25ESWYT+24ESWYT+543LINE+WON\_SA) spring planted at Takhar in 2008-2009

Variety		Grain Yield			Days to		Plant Height (cm)	Field Selection
Entry No.	Name/Pedigree	Kg/ha	Rank	% of Check	Heading	Maturity		
1	SHIBIA/4/PGO//CRIC-1/AE.SQUARROS	3348	8	98	152	182	80	
2	CAL/NH//567.71/3/SWRI/4/CAL/NH//---	3444	5	101	152	187	75	
3	CHEN/AEGILOPS SQUARROSA(TAUS)//BCN	2460	15	72	152	189	78	
4	VEE/PJN//KAUZ/3/PASTOR	3428	6	100	151	184	84	
5	FISCAL	2854	13	83	151	181	72	
6	ARYNA-07	3947	2	115	150	186	85	
7	VEE/PJN//2*TUI/3/PFAU/VOW/VEE#9/4/PASTOR	3697	4	108	150	185	73	
8	CROC_1/AE.AQUARROSA(205)//KAUZ/3/PASTOR	2907	12	85	150	185	88	
9	SER1*3//LR6010/4*YR/3/PASTOR/4/VAV92	2682	14	78	152	187	78	
10	CIMMYT-1	3008	11	88	151	185	78	
11	CIMMYT-3	3767	3	110	151	186	77	
12	IREXIA/WEAVER	3103	10	91	152	187	74	
13	OASIS/SKAUZ//4*BCN/3/2*PASTOR	4568	1	133	151	183	76	
14	CDNO/LR143//ENTE/MEXI	3214	9	94	152	187	76	
15	CHECK ( LALMI-2)	3426	7	Check	150	183	89	
Mean		3324			151	185	79	
Max		4568			152	189	89	
Min		2460			150	181	72	
EMS		172892			0.216155	3.48264	18.3051	
LSD <sub>0.05</sub>		823.598			0.838	3.344	7.719	
F (Prob)		0			0	0.001	0	
CV %		13			0	1	5	

Table 47: AYT (25ESWYT+24ESWYT+543LINE+WON\_SA) At Darulaman Spring planted 2008-2009

Variety		Grain Yield			Days to		Plant	Agronomic	Color	Yellow Rust	Selection
Entry No.	Name/Pedigree	kg/ha	Rank	% of Check	Heading	Maturity	Height (cm)	Score			
1	SHIBIA/4/PGO//CRIC-1/AE.SQUARROS	2839	13	87	73	110	67	4	A	0	
2	CAL/NH//567.71/3/SWRI/4/CAL/NH//---	3776	1	115	72	111	68	4	A	0	*
3	CHEN/AEGILOPS SQUARROSA(TAUS)//BCN	2862	11	87	73	111	70	3	A	20MR	
4	VEE/PJN//KAUZ/3/PASTOR	2729	14	83	74	109	65	4	LA	TR	
5	FISCAL	2844	12	87	70	109	67	4	A	0	*
6	ARYNA-07	2953	9	90	72	112	68	4	A	80S	
7	VEE/PJN//2*TUI/3/PFAU/VOW/VEE#9/4/PASTOR	2113	15	65	73	112	59	4	A	TR	
8	CROC_1/AE.AQUARROSA(205)//KAUZ/3/PASTOR	3304	4	101	79	110	69	4	A	40MS	
9	SER1*3//LR6010/4*YR/3/PASTOR/4/VAV92	2905	10	89	70	112	67	4	A	10MS	
10	CIMMYT-1	3002	8	92	74	109	67	5	A	20MS	
11	CIMMYT-3	3769	2	115	73	109	58	4	A	TR	
12	IREXIA/WEAVER	3252	6	99	75	111	64	4	A	0	*
13	OASIS//SKAUZ//4*BCN/3/2*PASTOR	3387	3	103	72	110	67	4	A	40MS	
14	CDNO/LR143//ENTE/MEXI	3225	7	98	74	110	62	4	A	TR	*
15	CHECK ( LALMI-2)	3276	5	Check	73	110	68	4	A	TR	
Mean		3082			73	110	66				
Max		3776			79	112	70				
Min		2113			70	109	58				
EMS		440634			3.5663	1.5746	26.4986				
LSD <sub>0.05</sub>		1170.20			3.37	2.20	9.21				
F (Prob)		0.342			0.003	0.055	0.335				
CV %		22			3	1	8				

**Table 48: AYT Badakhshan 2008/2009**

Variety		Grain Yield			Days to		Plant Height(cm)	1000 GWT.	Field Selection
Entry No.	Name/Pedigree	kg/ha	Rank	% of Check	Heading	Maturity			
1	FLORKWA.1/DHARWAR DRY	3777	3	126	133	181	81	40	
2	CASKOR/3/CROC_1/AE.SUARROSA(224)/OPATA	3505	6	117	134	180	76	39	
3	RL6043/4*NAC//PASTOR	3478	7	116	132	181	72	44	
4	MILAN/KAUZ*2/6/TOB/ERA//TOB/CNO67/3/PLO/4/VEE#5/5/KAUZ	3983	2	132	132	177	75	44	
5	FRTL/2*PIFED	3439	8	114	133	178	75	39	
6	RL6043/4*NAC//PASTOR/3/BABAX	3548	5	118	133	179	79	38	
7	ORE F1.158/FDL//BLO/3/SHI441	4100	1	136	133	178	81	41	
8	SHI#4414/CROWS*//UNKNOWN	3725	4	124	134	179	80	39	
9	SABALAN/4/VRZ/3/OR F1.148/T	3313	9	110	133	177	80	45	
10	Local Check ( Pamir 96 )	3008	10	Check	133	178	76	41	

Mean		3588			133	179	77	41	
Max		4100			134	181	81	45	
Min		3008			132	177	72	38	
EMS		190822			1.07814	3.56337	29.7286	14.1444	
LSD <sub>0.05</sub>		851.25			2.045	3.658	10.8	6.947	
F (Prob)		0.259			0.53	0.18	0.567	0.294	
CV %		12			1	1	7	9	

Table 49: PYT (40 IBWSN) Darulaman 2008/2009

Entry No.	Variety	Grain Yield			Days to		Plant	1000	G.	Agronomic	Yellow	Selection
	Name/Pedigree	Kg/ha	Rank	% of Check	Heading	Maturity	Height (cm)	GWT.	Color	Score	Rust	
1	PFAU/WEAVER*2//KIRITATI	4436	14	98	134	172	78	36	A	4	40MS	
2	PFAU/WEAVER*2//KIRITATI	4653	8	103	133	172	83	32	A	4	20MR	
3	PFAU/WEAVER*2/3/WEAVER/ESDA//BORL95	4176	16	92	135	174	75	32	A	3	60MS	
4	PFAU/WEAVER*//BRAMBLING	4895	6	108	133	173	73	32	A	4	40MS	
5	SW119*2/4/SNI/TRAP#1/3/KAUZ*2/TRAP//KAUZ	3793	22	84	130	170	73	30	WA	4	80S	
6	UP2338*2/4/SNI/TRAP#1/3/KAUZ*2/TRAP//KAUZ	3951	18	87	136	174	79	32	RA	3	80S	
7	WBLLI*2CHAPIO	4456	12	98	136	175	86	30	A	3	5R	*
8	BL 1496/MILAN//SSERII	5576	2	123	134	172	79	30	RA	3	20MS	*
9	BL 1496/MILAN/3/CROC_1/AE.SWUARROSA (205)//...	3649	23	80	132	170	64	26	LA	3	100S	
10	BONASA //BAV92/RAYON	4002	17	88	140	168	81	26	A	3	5R	*
11	HPO/TAN//VEE/3/2*PGO/4/MILAN/5/SSERII	2631	25	58	133	173	73	30	LA	3	100S	
12	JWS 17/7//AS58/4/KAL/BB//CJ71/3/ALD/5/CNR/6/...	3868	21	85	137	173	78	32	LA	3	80S	
13	KAUZ/HEVO//CHOIX/3/MILAN	3932	19	87	137	173	78	28	RA	2	80S	
14	KAUZ/PASTOR//PBW343	4584	10	101	137	174	78	32	LA	3	0	*
15	MILAN/PASTOR	4588	9	101	138	177	75	44	RA	4	40MS	
16	MILAN/S87230//BABAX	4683	7	103	135	172	80	44	LA	5	10MR	**
17	LOCAL CHECK **Aruana -07**	5639	1	124	137	175	81	35	LA	4	40MS	
18	SUNSU/CHIBIA	4434	15	98	139	178	78	30	A	3	5R	*
19	LOCAL CHECK **CHECK**	5304	4	117	137	179	83	34	A	4	60MS	
20	TC14/2*HTG//MILAN/3/BAU/MILAN	5371	3	118	137	176	82	32	A	3	60MS	
21	TEG/MIAN YANG20//CHM18/5BCN	4454	13	98	140	178	85	46	A	4	10R	*
22	TIMBA	3874	20	85	137	173	80	32	A	4	80S	
23	VEE#5/SARA//OCEP14	3645	24	80	141	178	85	36	RA	3	5R	*
24	VK237/2*PASTOR	5061	5	112	137	175	78	36	A	4	40MR	
25	Local Check ( Ariana 07 )	4537	11	Check	139	177	82	37	A	4	TR	

Mean	4408			136	174	79						
Max	5639			141	179	86						
Min	2631			130	168	64						
EMS	404750			2.2475	1.06791	15.5509						
LSD0.05	1486.833			3.5	2.215	8.796						
F (Prob)	0.047			0	0	0.013						
CV %	14			1	1	5						

Table 50: PYT (40IBWSN) Nangarhar (Shishambagh) research station 2008/2009

Entry No.	Variety Name/Pedigree	Grain Yield			Days to		Plant	1000	% Stand	Yellow Rust	Selection
		Kg/ha	Rank	% of Check	Heading	Maturity	Height (cm)	GWT.			
1	FRET2/KUKUNA//FRET2	6464	2	157	97	154	105	43.5	90		*
2	INQALAB 91*2/KHVAKI	5655	9	137	100	156	110	39	94		
3	INQALAB 91*2/TUKURU	4539	37	110	101	156	100	40	75		*
4	PFAU/WEAVER*2//KIRITATI	5221	17	127	100	156	100	40	85		*
5	PFAU/WEAVER*2/3/WEAVER/ESDA//BORL95	4639	32	112	101	156	100	36	85		*
6	PFAU/WEAVER*2/3/WEAVER/ESDA//BORL95	4433	39	107	102	155	100	36	96	5MR	
7	SW00-60165*2/TUKURU	4554	36	110	99	155	100	30	92	TR	*
8	UP2338*2/4/SNI/TRAP#1/3/KAUZ*2/TRAP//KAUZ	3451	48	84	106		53		10		
9	UP2338*2/4/SNI/TRAP#1/3/KAUZ*2/TRAP//KAUZ	3588	46	87	106	160	100	35.5	10	20MS	
10	WAXWING/4/SNI/TRAP#1/3/KAUZ*2/TRAP//KAUZ	5099	20	124	99	155	100	40	60	60S	
11	WAXWING/KIRITATI	4905	25	119	100	156	105	40	92	20MR	
12	WBL1*2/4/SNI/TRAP#1/3/KAUZ*2/TRAP//KAUZ	5424	14	131	105	156	110	44	90		*
13	WBL1*2/4/SNI/TRAP#1/3/KAUZ*2/TRAP//KAUZ	6657	1	161	103	158	110	38	20		
14	WBL1*2/KURUKU	5527	13	134	105	158	110	40	65		*
15	WBL1*2/KURUKU	4835	26	117	102	158	105	33.4	88		*
16	WBL1*2/TUKURU	6344	3	154	102	157	115	38	96	10MS	
17	ATTILA3*BCN*2//BAV92	5314	16	129	104	158	100	36.8	96		*
18	ATTILA3*BCN//BAV92/3/PASTOR	5211	18	126	104	158	100	34	88		
19	ATTILA3*BCN//BAV92/3/TILHI	5591	11	135	103	158	105	32	88		*
20	BABAX//IRENA/KAUZ/3/HUITES	4158	42	101	101	158	100	36	86	10MR	*
21	BL 1496/MILAN/3/CROC_1/AE.SUARROSA (205)//KAUZ	4832	27	117	104	157	105	35.5	96		
22	BONASA//BAV92/RAYON	5044	21	122	100	156	105	42.9	92		*
23	BOW/PRL//BUC/3/LUAN/4/PASTOR/3/KAUZ*2/OPATA//KAUZ	5608	10	136	101	156	100	37	90	20MS	
24	CAL/NH//H567.71/3/SERI/4/CAL/NH//H567.71/5/2*KAUZ/6/PASTOR	5911	6	143	101	156	100	36	96		
25	CBRD//KAUZ//PARUS/4/KAUZ*2//SAP/MON/3/KAUZ	5974	5	145	99	156	100	41	88		*
26	CIRCUS/PBW343	4924	24	119	107	157	100	39.5	94		
27	CROC_1/AE.SUARROSA (205)//BORL95/3/2*MILAN	3727	45	90	104	157	105	35	92	10MR	
28	CROC_1/AE.SUARROSA (205)//KAUZ/3/SASIA	4797	29	116	107	157	105	37	30		
29	EFED/FINSI	4433	38	107	107	157	110	35.5	50		
30	FINSI/METSO	4927	23	119	105	157	110	39	65		*

31	FINSI/METSO	4608	34	112	109	158	105	32	84		*
32	GAN/AE.SQUARROSA (408)//2*OASIS/5*BORL95	4716	30	114	107	158	110	32	90		
33	HD2177/HUITES	4986	22	121	103	158	105	36	65		
34	HEILO	3061	49	74	104	157	105	25	80	100S	
35	HPO/TAN//VEE/3/2*PGO/4/MILAN/5/SSERI1	4586	35	111	103	157	105	39	88		
36	HPO/TAN//VEE/3/2*PGO/4/MILAN/5/SSERI1	4397	40	107	108	158	105	39	40	10MS	
37	JWS 177//IAS58/4/KAL/BB//CJ71/3/ALD/5/CNR/6/THB/CEP7780/8/FINSI	5538	12	134	99	157	105	39	30		*
38	KAUZ/PASTOR//PBW343	4624	33	112	106	158	105	36	65		
39	MILAN/S87230//BABAX	3572	47	87	102	158	100	32	20		
40	MILAN/S87230//BABAX	5728	7	139	102	157	95	34	60		
41	MINO	5980	4	145	105	157	105	43	84		*
42	NG8675/METSO	5705	8	138	104	157	110	40	86		*
43	OASIS/SKAUZ//4*BCN/3/PASTOR	5324	15	129	108	157	105	36	88		
44	PASTOR/3/VEE#5//DOVE/BUC	4318	41	105	105	157	95	39	55		
45	PF74354//LD/ALD/4/2*BR12*2/3/JUP//PAR214*6/FB6631/5/NL 750	4647	31	113	108	157	105	36.5	80		
46	PRINIA/PASTOR	2738	50	66	109	160	100	38	10		
47	SRN/AE.SQUARROSA (358)//HXL7573/2*BAU/3/PASTOR	5199	19	126	109	160	95	39	30		
48	SUM3/2*BAU/MILAN	4803	28	116	109	157	110	39	50		
49	SUNSU/CHIBIA	4114	44	100	108	157	105	36	40		
50	Local Check (Solha-2)	4127	43	Check	100	156	100	36	96		

Mean		4891			104		103				
Max		6657			109		115				
Min		2738			97		53				
EMS		924424			4.66203		110.25				
LSD0.05		1951.699			4.678		21.101				
F (Prob)		0.096			0		0.167				
CV %		20			2		10				

## National Uniform Barley Yield Trial (NBYT 08/09)

### Material and methods:

This study was conducted at three sites viz., Darulaman, Posi-e-shan and Bagh-e-Zakhira, representing different agro-ecological conditions in Afghanistan. This trial comprised of 14 Barley genotypes promoted from ABYT and PBYT to confirm the adaptability and stability for yield. This study was conducted during Barley growing season (early spring) and harvested in the middle of Jun 2009. Using a randomized complete block design with genotypes arranged in alpha lattice combination in three replications. Individual experimental plots of 6.0 m<sup>2</sup> were seeded as six, 5m long rows with 0.20m row spacing. Fertilizers were mixed into the soil prior to seeding as per local practice.

The experimental plots were hand weeded as necessary at individual sites, the other trial management practices were consistent with good crop husbandry recommended for each site. Days to heading was recorded when spikes of approximately 50% of the plants in a plot were fully emerged. At maturity plant height in each plot was measured from ground level to the tip of the spikes.

Days to maturity were recorded when glumes completely lost their green color. Agronomic score of the genotypes at maturity was recorded using a scale of 1 to 5 with 5 representing the best combination of agronomic trials based on the criteria circulated in CIMMYT's Wheat trial field books. Plants were hand-harvested at the ground level from the middle 3.2 m<sup>2</sup> at each site, to determine the significance of differences among the genotype in each specific environment.

### Result:

The mean yield of 15 varieties of barley in National Uniform Barley Yield Trials (NBYT) tested at Darulaman, Posi-e-shan and Bagh-e-Zakhira research stations ranged from 1751 Kg/ha to 3058 Kg/ha with over all mean of 2495 Kg/ha. The highest yield of 3058 Kg/ha was recorded for entry # 5 and lowest yield was obtained from entry # 2.

At Darulaman research station the following varieties occupied the first non significant group: # 2, 4, 5,6,7,8,9,11 and 14. However, variety # 8 produced the mean yield of 5401 Kg/ha, variety # 2 yielded 4970 Kg/ha, variety # 5 yielded 4626 Kg/ha, and varieties 4, 9, 6, 7, 14, 11 produced 4574 Kg/ha, 4547 Kg/ha, 4492 Kg/ha, 4440 Kg/ha, 4247 Kg/ha and 4205 Kg/ha respectively. Compared to the local check (3542Kg/ha) the above mentioned varieties produced 52 %, 40 %, 31 %, 29 %, 28 %, 27 %, 25 %, 20 % and 19% higher yield respectively.

At Poze-i-Shan research station, there were no significant differences among the mean yield of varieties 2, 5, 8, 9, 10 and 14. However the mentioned varieties produced 1552 Kg/ha, 1591Kg/ha, 1551 Kg/ha, 1669 Kg/ha, 1775 Kg/ha and 1588 Kg/ha and were ranked 5, 1, 6, 3, 2 and 4 respectively, while the local check yielded 883 Kg/ha and got position no 13. Compared to check, these varieties produced 76 %, 114%, 76% 89%, 10% and 80% higher yield respectively.

At Bagh-e-Zakhira, there were no significant differences among varieties 5, 6, 7, 9, 10 and variety 14. However, these varieties produced 2658 Kg/ha, 2400 Kg/ha, 2604 Kg/ha, 2782 Kg/ha, 2472 Kg/ha and 2172 Kg/ha respectively and were ranked 2, 5, 3, 1, 4 and 6, while local variety produced 1321 Kg/ha and was ranked #12. The varieties mentioned above produced 101%, 82%, 97 %, 111%, 87% and 64% higher yield compared to local variety.



**Conclusion:**

These exotic genotypes were tested at diverse locations. Results revealed that most of them showed wide adaptation and they produced higher yield than local varieties. Out of 14 varieties tested, variety # 2, 5, 6, 7, 8, 9, 10 and 14 were the most suitable varieties over locations, so the above mentioned varieties were advanced for further testing.

**Table 51: Yield Performance of NBYT (National barley yield trial) at Darulaman, Kabul genotypes in NBYT 2008/2009**

Entry No.	Variety Name/Pedigree	Grain Yield			Days to		Plant Height (cm)	1000 GTW.	Bloch %	LOD %	Yellow Rust	Selection
		kg/ha	Rank	% of Check	Heading	Maturity						
1	BOLDO/MJA/CABUYA3/CIRU	4182	10	118	63	92	76	40	5	20	0	
2	SLLO/ROBUST//QUINA3/PETUNIS1/4/CIRU	4970	2	140	63	94	79	38	0	20	0	*
3	BOLDO/MJA/PINON	4143	11	117	63	93	74	39	5	20	5tr	
4	BANT-B/NBR-BAR//2505/3/X1248/4/CEN-B/2*CAL192/5/CIRU	4574	4	129	62	92	69	44	0	20	0	
5	TOCTE/TOCTE//BERROS3/PETUNIA1/4/CANTUA	4626	3	131	64	93	71	36	0	20	0	
6	SLLO/ROBUST//QUINA3/BBSC/4/BLLU	4492	6	127	65	94	66	40	0	20	0	**
7	GLORIA-BAR/COPL//SEN3/PETUNIA 1/4/CIRU	4440	7	125	64	93	68	39	0	20	0	**
8	IBTA08/3/TULE/ESTATE//UNA80/4/RHODES/CI14100//LIGNEE527/5/DELO/6/PETUNIA 2	5401	1	152	64	90	73	40	5	20	5tr	
9	MJA/BRB2//QUINA/5/	4547	5	128	56	93	69	45	0	20	0	*
10	MORCPC9.75/ARABI ASWAD/3/TADMOR//RPJO/MAZURKA	3403	14	96	54	92	59	40	5	20	20ms	
11	PETUNIA 2/3/GAL/PI6384//ESC.II.72.607.1E.4E.5E	4205	9	119	19	31	24	44	0	20	60ms	
12	PETUNIA 2/3/GAL/PI6384//ESC.II.72.607.1E.4E.5E	3254	15	92	66	90	67	40	0	20	20ms	
13	KENYA RESEARCH/BELLE//AS46/2*ATHS-B	3801	12	107	62	93	68	45	5	20	0	*
14	TOCTE/3/GAL/PI6384//ESC.II.72.607.1E.4E.5E/4/	4247	8	120	59	92	73	44	0	20	5tr	*
15	CHECK (Kunduzi)	3542	13	Check	63	92	66	40	0	20	40s	

Mean		4255			59	88	67					
Max		5401			66	94	79					
Min		3254			19	31	24					
EMS		351276			75.6222	192.416	116.434					
LSD0.05		1223.39			15.23	24.90	20.29					
F (Prob)		0.023			0	0.001	0.001					
CV %		14			15	16	16					

**Table 52: Yield Performance of NBYT (National barley yield trial) at Baghlan genotypes in NBYT 2008/2009**

Entry No.	Variety Name/Pedigree	Grain Yield			% Stand	Days to		Plant Height (cm)	1000 GWT.	Field Selection
		kg/ha	Rank	% of Check		Heading	Maturity			
1	BOLDO/MJA/CABUYA/3/CIRU	1228	8	139	84	70	91	52	25	
2	SLLO/ROBUST//QUINA/3/PETUNIS1/4/CIRU	1552	5	176	86	69	85	53	25	
3	BOLDO/MJA/PINON	751	15	85	83	68	87	50	28	
4	BANT-B/NBR-BAR//2505/3/X1248/4/CEN-B/2*CAL192/5/CIRU	1208	11	137	81	69	86	48	25	
5	TOCTE/TOCTE//BERROS/3/PETUNIA1/4/CANTUA	1891	1	214	88	69	88	53	30	
6	SLLO/ROBUST//QUINA/3/BBSC/4/BLLU	1165	12	132	94	69	89	49	25	
7	GLORIA-BAR/COPL//SEN/3/PETUNIA 1/4/CIRU	1462	7	166	87	68	86	53	26	
8	IBTA08/3/TULE/ESTATE//UNA80/4/RHODES/C114100//LIGNEE527/5/DELO/6/PETUNIA 2	1551	6	176	85	69	90	50	32	
9	MJA/BRB2//QUINA/5/	1669	3	189	82	61	79	50	33.5	
10	MORCPC9.75/ARABI ASWAD/3/TADMOR//RPJO/MAZURKA	1775	2	201	80	56	74	55	34.5	
11	PETUNIA 2/3/GAL/P16384//ESC.II.72.607.1E.4E.5E	1218	9	138	75	58	78	50	31.5	
12	PETUNIA 2/3/GAL/P16384//ESC.II.72.607.1E.4E.5E	846	14	96	79	69	88	46	31	
13	KENYA RESEARCH/BELLE//AS46/2*ATHS-B	1210	10	137	85	58	79	56	36.5	
14	TOCTE/3/GAL/P16384//ESC.II.72.607.1E.4E.5E/4/	1588	4	180	84	67	88	57	32	
15	CHECK (Local)	883	13	100	85	61	82	48	27	
Mean		1333			84	65	85	51		
Max		1891			94	70	91	57		
Min		751			75	56	74	46		
EMS		37610.7			40.46	0.622	3.54101	18.9945		
LSD0.05		369.12			12.46	1.38	3.50	8.30		
F (Prob)		0			0.303	0	0	0.144		
CV %		15			8	1	2	8		

**Table 53: Yield Performance of NBYT (National barley yield trial) at Takhar genotypes in NBYT 2008/2009**

Entry No.	Variety	Grain Yield			Days to		Plant Height (cm)	Yellow Rust	Field Selection
	Name/Pedigree	Kg/ha	Rank	% of Check	Heading	Maturity			
1	BOLDO/MJA//CABUYA/3/CIRU	987	15	75	148	171	82	0	
2	SLLO/ROBUST//QUINA/3/PETUNIS1/4/CIRU	2012	7	152	149	172	80	5S	
3	BOLDO/MJA//PINON	1089	14	82	147	171	81	0	
4	BANT-B/NBR-BAR//2505/3/X1248/4/CEN-B/2*CAL192/5/CIRU	1746	9	132	148	173	76	0	
5	TOCTE/TOCTE//BERROS/3/PETUNIA1/4/CANTUA	2658	2	201	146	175	85	0	
6	SLLO/ROBUST//QUINA/3/BBSC/4/BLU	2400	5	182	148	173	79	0	
7	GLORIA-BAR/COPL//SEN/3/PETUNIA 1/4/CIRU	2604	3	197	148	171	88	0	
8	IBTA08/3/TULE/ESTATE//UNA80/4/RHODES/CH14100//LIGNEE527/5/DELO/6/PETUNIA 2	1608	10	122	150	172	83	0	
9	MJA/BRB2//QUINA/5/	2782	1	211	142	169	85	10S	
10	MORCPC9.75/ARABI ASWAD/3/TADMOR//RPJO/MAZURKA	2472	4	187	139	169	84	20MS	
11	PETUNIA 2/3/GAL/PI6384//ESC.II.72.607.1E.4E.5E	1565	11	118	142	172	81	20MS	
12	PETUNIA 2/3/GAL/PI6384//ESC.II.72.607.1E.4E.5E	1153	13	87	151	170	77	0	
13	KENYA RESEARCH/BELLE//AS46/2*ATHS-B	1885	8	143	143	172	86	20MS	
14	TOCTE/3/GAL/PI6384//ESC.II.72.607.1E.4E.5E/4/	2172	6	164	145	171	91	0	
15	CHECK ( )	1321	12	Check	143	170	82	50MS	

Mean		1897			146	171	83		
Max		2782			151	175	91		
Min		987			139	169	76		
EMS		125247			1.37	2.27	27.75		
LSD0.05		660.81			2.10	2.85	9.23		
F (Prob)		0			0	0.003	0.103		
CV %		19			1	1	6		

**Table 54: Across mean of NBYT (National barley yield trial) at three locations in NBYT 2008/2009**

Variety		Grain Yield Kabul			Grain Yield Baghlan			Grain Yield Takhar			Across Mean		
Entry No.	Name/Pedigree	kg/ha	Rank	% of Check	kg/ha	Rank	% of Check	Kg/ha	Rank	% of Check	Kg/ha	Rank	% of Check
1	BOLDO/MJA//CABUYA/3/CIRU	4182	10	118	1228	8	139	987	15	75	2133	12	111
2	SLLO/ROBUST//QUINA/3/PETUNIS1/4/CIRU	4970	2	140	1552	5	176	2012	7	152	2845	4	149
3	BOLDO/MJA//PINON	4143	11	117	751	15	85	1089	14	82	1994	13	104
4	BANT-B/NBR-BAR//2505/3/X1248/4/CEN-B/2*CALI92/5/CIRU	4574	4	129	1208	11	137	1746	9	132	2509	9	131
5	TOCTE/TOCTE//BERROS/3/PETUNIA1/4/CANTUA	4626	3	131	1891	1	214	2658	2	201	3058	1	160
6	SLLO/ROBUST//QUINA/3/BBSC/4/BLLU	4492	6	127	1165	12	132	2400	5	182	2686	6	140
7	GLORIA-BAR/COPL//SEN/3/PETUNIA 1/4/CIRU	4440	7	125	1462	7	166	2604	3	197	2835	5	148
8	IBTA08/3/TULE/ESTATE//UNA80/4/RHODES/CH14100//LIGNEE527/5/DELO/6/PETUNIA 2	5401	1	152	1551	6	176	1608	10	122	2853	3	149
9	MJA/BRB2//QUINA/5/	4547	5	128	1669	3	189	2782	1	211	2999	2	157
10	MORCPC9.75/ARABI ASWAD/3/TADMOR//RPJO/MAZURKA	3403	14	96	1775	2	201	2472	4	187	2550	8	133
11	PETUNIA 2/3/GAL/PI6384//ESC.II.72.607.1E.4E.5E	4205	9	119	1218	9	138	1565	11	118	2329	10	122
12	PETUNIA 2/3/GAL/PI6384//ESC.II.72.607.1E.4E.5E	3254	15	92	846	14	96	1153	13	87	1751	15	91
13	KENYA RESEARCH/BELLE//AS46/2*ATHS-B	3801	12	107	1210	10	137	1885	8	143	2299	11	120
14	TOCTE/3/GAL/P16384//ESC.II.72.607.1E.4E.5E/4/	4247	8	120	1588	4	180	2172	6	164	2669	7	139
15	Local Check	3542	13	Check	883	13	Check	1321	12	Check	1915	14	100
Mean		4255			1333			1897			2495		
Max		5401			1891			2782			3058		
Min		3254			751			987			1751		
EMS		351276			37610.7			125247					
LSD0.05		1223.39			369.12			660.81					
F (Prob)		0.023			0			0					
CV %		14			15			19					

**Table 55: Yield Performance of Barley genotypes in ABYT at Darulaman, Kabul In 2008-2009**

Entry No.	Variety Name/Pedigree	Grain Yield			Days to		Plant Height (cm)	Lodging %	Bloch %	Agronomic Score	Yellow Rust	Selection
		kg/ha	Rank	% of Check	Heading	Maturity						
1	TOCTE/TOCTE//BERROS/3/PETUNIA 1/4/CANTUA	5626	1	133	65	94	77	20	0	4	0	*
2	IBTA80/3/TULE/ESTATE//UNA80/4/RHODES/C114100// LIGNEE527/5/DELO/6/PETUNIA 2	4674	5	110	65	92	76	20	0	4	0	*
3	ALPHA-BAR/DURRA//CORACLE/3/ALELI/4/MPYT169.IY /LAUREL//OLMO/5/	5320	2	126	63	90	72	20	5	4	5Tr	*
4	P.STO/3/LBIRAN/UNA80//LIGNEE640/4/BLLU/5/PETUNIA	4965	3	117	63	91	75	20	5	3	0	*
5	MOROC9.75ARABI ASWAD/3/TADMOR//ROHO//MAZURKA	2831	15	67	55	90	57	20	0	4	60ms	
6	MJA/BRB2//QUINA/5/....	3956	12	93	60	91	65	20	5	4	0	*
7	CEN-B/2*CALI92	4166	8	98	57	90	66	20	5	5	0	*
8	ALANDA/LIGNEE527//ARAR/3BF891M.617	3820	13	90	56	90	61	20	5	4	10ms	
9	PETUNIA 1/8/POSTCOPAL/5/GLORA-BAR/4/SOTOL/2762/..	4043	10	96	58	90	67	20	0	4	0	*
10	PETUNIA 1/8/POSTCOPAL/5/GLORA-BAR/4/SOTOL/1....	3988	11	94	60	93	68	20	5	4	0	
11	BLLU/KANTUTA/3/CHAMICO/TOCTE//CONGONA	4113	9	97	64	91	68	20	5	4	10mr	
12	PETUNIA 1/8/POSTCOPAL/5/GLORA-BAR/4/SOTOL/2762/...	4873	4	115	64	92	77	20	0	4	0	*
13	PETUNIA 2/3/ARUPO/K8755//MORA/4/ALELI	4208	7	99	58	93	68	20	5	3	40ms	
14	ALANDA//LIGNEE527//ARAR/3/BF891M-617	3475	14	82	60	90	67	20	5	4	40s	
15	CHECK (Kunduzi)	4232	6	Check	63	60	69	20	0	5	80s	

Mean		4286			61	89	69					
Max		5626			65	94	77					
Min		2831			55	60	57					
EMS		253422			0.42	182.27	23.29					
LSD0.05		942.21			1.14	23.64	9.03					
F (Probe)		0			0	0.399	0.001					
CV %		12			1	15	7					

**Table 56: Yield Performance of Barley genotypes in ABYT at Baghlan In 2008-2009**

Entry No.	Variety Name/Pedigree	Grain Yield			% Stant	Days to		Plant Height (cm)	1000 GWT.	Field Selection
		kg/ha	Rank	% of Check		Heading	Maturity			
1	TOCTE/TOCTE//BERROS/3/PETUNIA 1/4/CANTUA	2595	1	230	88	64	88	59	25	
2	IBTA80/3/TULE/ESTATE//UNA80/4/RHODES/C114100// LIGNEE527/5/DELO/6/PETUNIA 2	2050	6	182	92	65	89	52	30	
3	ALPHA-BAR/DURRA//CORACLE/3/ALELI/4/MPYT169.1Y/LAUREL//OLMO/5/	1924	7	170	90	62	84	53	25	
4	P.STO/3/LBIRAN/UNA80//LIGNEE640/4/BLLU/5/PETUNIA	1585	12	140	87	59	78	49	27.5	
5	MOROC9.75ARABI ASWAD/3/TADMOR//ROHO//MAZURKA	2388	3	211	86	54	76	56	40	
6	MJA/BRB2//QUINA/5/...	2334	4	207	87	57	78	61	50	
7	CEN-B/2*CALI92	1570	13	139	90	56	76	50	37.5	
8	ALANDA/LIGNEE527//ARAR/3BF891M.617	1824	8	162	82	58	82	58	30	
9	PETUNIA 1/8/POSTCOPAL/5/GLORA-BAR/4/SOTOL/2762/...	1791	9	159	87	57	82	64	32	
10	PETUNIA 1/8/POSTCOPAL/5/GLORA-BAR/4/SOTOL/...	2435	2	216	89	56	76	66	34	
11	BLLU/KANTUTA/3/CHAMICO/TOCTE//CONGONA	1716	10	152	93	67	88	54	27.5	
12	PETUNIA 1/8/POSTCOPAL/5/GLORA-BAR/4/SOTOL/2762/...	1685	11	149	87	59	80	60	28	
13	PETUNIA 2/3/ARUPO/K8755//MORA/4/ALELI	1010	15	89	81	57	78	60	25	
14	ALANDA//LIGNEE527//ARAR/3/BF891M-617	2271	5	201	85	59	79	63	30.5	
15	CHECK (Local Variety)	1129	14	Check	96	60	79	56	25	
Mean		1887			88	59	81	57		
Max		2595			96	67	89	66		
Min		1010			81	54	76	49		
EMS		146200			18.41	1.43	2.68	34.82		
LSD0.05		688.26			7.80	2.11	2.87	11.04		
F (Prob)		0.001			0.042	0	0	0.063		
CV %		20			5	2	2	10		

## **Maize Report 2009:**

### **Introduction**

CIMMYT-Afghanistan obtained several maize yield trials from the international agriculture research center testing network of CIMMYT, India, Pakistan, Iran, China and Zimbabwe in the past five years and tested at several locations across Afghanistan. These trials included genotypes with adaptation potential for different agro-ecological condition of Afghanistan. These genotypes primarily included high yielding populations for general and specific production areas such as high temperature, tropical and subtropical climates. Outstanding entries from different trials were selected and advanced for further testing.

**Maize research during the year under report included the following three activities.**

1. On – Farm testing and seed multiplication of maize varieties (OPVs).
2. Documentation of one new maize (OPVs) release proposal.
3. Capacity building of national agricultural researchers in maize improvement.

### **Seed multiplication of RAMPUR 9433:**

CIMMYT-AF provided 15 Kg of prerelease maize Rampur 9433 and delivered to ARIA and FA/A4 partners for On –Farm testing and as well as for seed multiplication. This variety was planted in Bagh-e-Zakhira, Takhar Province and at the Farm of Faculty of Agriculture in Kabul during maize growing season (July to Oct) 2009. Technical assistance via regular field visit and monitoring related activities were provided hand in hand by CIMMYT during maize growing season. The total harvest included 1650 Kg of base seed grade # 1 and 1870 Kg base seed grad # 2. After release of this variety the product will be delivered to improved seed enterprise/ end users by ARIA for further multiplication.

### **Quality protein maize variety (QPMV) multiplication:**

One QPM variety was released by the name Mughazi in 2008. The variety is under multiplication at Baghlan, Nangarhar and Kabul.



### Documentation of new maize (OPV) release proposal:

An 18 page document for release of one OPV CIMMYT maize variety was prepared for submission to National Seed Board (NSB) for consideration for release.

### Sub: Application for the release of one new maize variety

The OP (open pollinated) maize variety Rampur 9433 was found to be the highest yielder and was accepted by farmers during the three years of multi location testing at various locations in Afghanistan. The variety is therefore proposed for release for commercial cultivation.

**Table1. Description of released variety.**

Type of maize	Pedigree/origin	Proposed Name
Normal	RAMPUR 9433, TL2002B6144	

### Variety Description

Parameter	Rampur 9433
Adaptation	Sub-tropical
Days to Pollen	73
Days to silk	79
Plant height	210 cm
Ear height	105 cm
Husk Cover	Tight
Kernel Type	Orange Flint
Kernel row arrangement	Straight
Number of kernel rows	16
Number of kernels per row	40
1000- Kernel weight	245 g
Ear length	19 cm
Ear diameter	4.0 cm
Cob color	White
Stem color	Dark Green
Average yield / ha	6.0 t
Potential yield/ ha	7.0

### Background information

Maize (*Zea mays*.L) is the largest producing cereal crop in the world covering about 22.6 % of cereal area and producing 32.6% of cereals (FAO, 2008). Maize contributes 15% protein

and 19% of the calories derived from food crops in the people's diet globally. For 20 developing countries, mainly in Latin America and Africa, maize is the single largest source of calories for the poor and is a primary weaning food for babies. Maize contains essential proteins, vitamins and important minerals. In addition to its use as animal and poultry feed, maize is produced for human consumption also in developing countries. In developed, countries maize is used for making oil, alcohol, starch, juice and sugar. Certain chemicals used in manufacturing phenol are derived from the maize.

In Afghanistan area under maize was 482,000 ha in 1978 just before the soviet occupation when the country was self sufficient in cereal production, whereas presently we are cultivating maize over 140,000 ha only contributing only 7.6% of cereal production signifying a huge gap to be filled by increasing the acreage as well as productivity. Maize in Afghanistan is produced by framers of east and south zone of Afghanistan where irrigation is not sufficient for rice cultivation. Compared to the global average of 5.1 t/ha and an Asian average of 4.5 t/ha, the productivity of maize in our country is very low at 2.0 t/ha. To achieve the 1978 acreage target of around 0.48 m ha, maize cultivation needs to be made more remunerative for the farmers. Since the irrigation requirements of maize are much lower compared to rice, it offers more lucrative option to resource poor farmers. Among several constraints that maize cultivation faces, biggest is the non availability of locally adapted, disease and insect pest resistant high yielding varieties and their quality seed. Poor knowledge base on crop management practices making efficient use of natural resources is another hurdle holding farmers from adopting maize cultivation. Despite many challenges and lack of opportunities, Agriculture Research Institute of Afghanistan (ARIA) released improved varieties of different crops in previous years. The new maize variety Rampur 9433 is next step in this direction directed at making available higher yielding options to the farmers of the country.

### **Materials and Methods:**

A large number of OP maize genotypes were introduced from the international maize testing unit and evaluated in different agro-ecological zones of Afghanistan. This study was conducted using a set of 15 maize genotype included in CIMMYT's, subtropical Experimental variety Trial for Afghanistan (2003, EVT-SAF) and a locally adapted cultivar which was changed at different sites based on local importance. These maize genotypes represent diverse

genetic background and resulted from crosses involving high yielding and disease and insect pest resistant parents. The genotypes were tested at different locations representing diverse maize growing agro-climatic zones of Afghanistan.

Trials were conducted during maize growing season (Jun to October) from 2003-2005 using a randomized completed block design with genotypes arranged in alpha lattice combination in two replications. Individual experimental plots of seven m<sup>2</sup> had two rows spaced 70 cm apart with plant to plant spacing of 20 cm. All recommended agronomic practices were adopted in conducting the trials. A basal dose of 200 Kg/ha of DAP was applied and urea at the rate of 72Kg/ ha was applied in two split doses after thinning of the maize when the plants were of around 30 cm height and at silk stage. The experimental plots were hand weeded and thinning was done when all seedlings had fully emerged.

Observations were recorded on days to flowering (male and female) when 75% of the plants in a plot had fully emerged, number of plants, number of harvested plants and ears, and plant height at maturity. Days to maturity was recorded when abscission layer was formed at the bottom of kernel. Agronomic score of the genotypes was recorded using a scale of the 1 to 5 with 5 representing the best combination of agronomic traits. Plants were hand harvested. Field weight (cob+ grain) at different moisture content and grain weight after sun drying were recorded. Analysis of variance was conducted for each site. A cross mean of three sites was also worked out.

## **Result and discussion**

The proposed maize variety (Rampur 9433) was initially tested along with 15 other varieties in experimental research units of Afghanistan during 2003. Based on grain yield and agronomic performances, six selected genotypes were again tested in EVT 04, EVT 05 at various locations as explained in the Tables 3, 4 and 5 representing across mean yield of the genotypes during testing year (2003-2005).

## **Conclusion and recommendation:**

The over all mean yield of three years, three locations and eight trials revealed that line Rampur 9433 was widely adapted in maize growing areas of Afghanistan and produced sustainable higher yields during testing years. (Table 2). This line produced yield levels

comparable with Shemal and Sharq varieties released in 2008, however it matures early. The diseases resistance response and other traits of this line are of acceptable level. Therefore, this variety is proposed for release as a new variety of maize to help farmers harvest higher yields per unit time compared to any other variety available in the country and prevent damage from frost. This variety may also be approved for seed multiplication purposes to provide seeds to the farmers in time.

### **General Information**

1. Common name: Maize
2. Botanical name: *Zea mays*.L
- 3 Type: Flint, red grain
- 4 Original designation/symbolic name used in testing:  
Subtropical early and late, white and yellow varieties for Afghanistan  
(IABV0340) 2003 EVT-SAF Entry #14.
6. Origin: CIMMYT, Mexico
7. Source of material  
This variety was selected from international trials; Subtropical experimental variety trial for Afghanistan provided by CIMMYT in 2003.
8. Year and site of testing varieties in Afghanistan

Maize growing regions in Afghanistan are highly diverse with respect to rainfall, soil fertility, fertilizer application rates, pest and disease profile etc. In the present situation we focus on open pollinated varieties (OPVs) because OP varieties provide consistently higher yield across range of environments and allow farmers to use their own seed for subsequent planting. Considering these points, ARIA with technical support of CIMMYT-Afghanistan procures and test improved maize genotypes in low and high altitude areas of Afghanistan. These materials are tested in multi location trials with the technical and financial support of CIMMYT, FAO. The proposed variety initially was tested in the EVT\_SAF at three sites in 2003. Based on grain yield, maturity, plant height, agronomic score, resistance to common maize diseases particularly

kernel rot, six promising varieties were selected and re-evaluated in advanced yield trial at two sites in 2004 and three sites in 2005 during maize growing season.

#### **9. Foundation seed available for multiplications**

Rampur9433: Grade – 1: 1500kg,, Grad-2: 1600kg

**Table 2. Summary mean yield (kg/ha) and agronomic traits during testing years (2003-2005)**

Genotypes	Across mean of grain yield (kg/ha)				Agronomic Traits						
	2003 3sits	2004 2sits	2005 3sits	Across mean	Days to pollen	Days to silk	Plant Height cm	Ear height cm	Plant Aspect	Ear Aspect	Husk Cover
Rampur 9433 *	7	6	6	6.3	73	79	210	105	4	4	4
Check: various											
Watani	3	-	-	3	48	50	153	92	2	2	3
Sakha 9433	5	6.4	7	6.1	88	93	208	117	4	4	4
Pirsaback 8730	-	5.8	7	6.4	91	97	197	112	4	4	4
60 Days	-	2.6	1.3	1.9	44	50	56	20	2	2	4

\* Cooperative advantage 15-18 days to tassel 14-18 days to silk.



Figure. OPV Maize Variety RAMPUR 9433

**Capacity building of national agricultural staff involved in maize improvement:**

Human resource capacity for maize seed production is important for those engaged in maize. This is necessary since maize seed production is much different from seed production of major staple wheat. All stakeholders including researcher, agriculture students or farmers have to know about the principals necessary for the production of quality maize seed. The project provided the ground of learning to those involved in this project viz., seven researchers and nine agriculture students. The activities involved training through technical interaction, participatory monitoring activities and regular field visits in Kabul and in Takhar with the research staff and partners. The main questions addressed were:

- ✦ How is OPV seed produced
- ✦ Isolating a seed production field
- ✦ How to select a suitable field
- ✦ How to manage seed production field
- ✦ Elimination undesirable plants
- ✦ Harvest and drying
- ✦ Shelling, cleaning and storing the seed

Participants learned above mentioned aspects.



## **5: Human resource capacity development and knowledge sharing**

### **Training activities**

While training will remain central to the project activities, it is interesting to observe that researchers' capacity has been enhanced using learning by doing approach and working closely with them. Overall, under the umbrella of the project, good linkages and partnerships have been envisaged/established with the national program and other partners in Afghanistan interested in wheat and maize improvement. New USAID Famine seed project has contributed to multiplication of Ug 99 varieties and made it possible to multiply faster.

Despite the difficult political and environmental uncertainties and instability, the project has successfully undertaken the planned activities. Further progress is expected on the technical aspects of wheat and maize improvement, pathology and agronomy through the enhancement of networks and the strengthening of collaboration and exchange of knowledge with ARIA, ICARDA, FAO, and relevant NGOs.

In addition, steady progress has been made with capacity building initiatives and this continues to be a high priority. Other donors also showed interest to contribute, however this is at the discussion and preliminary planning stage. USDA grant supported a 3 day workshop with participation of some of the stakeholders in Kabul. The Australian embassy was invited but could not participate. The workshop triggered the application of fungicides and importation of Muqawim 09 (released and named in Afghanistan in 2009) seed from Egypt. Further progress on new development will be communicated.

The Project Leader has served on a number of technical committees and has actively participated in a number of meetings. CIMMYT has provided advisory services to donor funded NGOs on wheat and maize improvement and assisted on the technical aspects of crop, nutrient and water management.

The project leader has been very effective in using his skills to mentor locals and NGO staff and thus continually broaden the influence of the project and its objectives. This project has contributed directly through a range of traveling seminars, workshop activities, and committee with a focus on development (e.g. germplasm evaluation and advancement) and through the training of Afghans working within the ARIA system.

Capacity building and training of national staff was given special attention. Human resource capacity on conducting wheat and maize research was enhanced. We followed up and worked closely with the Afghan researchers who received in-country training. A total of 30 researchers and production agronomists attended courses in CIMMYT regional program and Headquarters since opening CIMMYT office in Afghanistan. Number of training workshops for ARIA and partners was organized. Technical information on increasing wheat and maize production was disseminated.

In country training and technical interaction has been simultaneously provided during the process of planning and conducting the experiments, collecting data, tabulation and interpretation of the results. The international trials and nurseries also facilitated training activities and provided a ground which demonstrated potential technologies. Training on field plot techniques made it possible to use the incomplete block design with 2–3 replications instead of RCBD with 4 replications. Capacity of the researchers continued to be developed to use Alpha Lattice in PYT, AYT and NUT, and to perform statistical analysis as it developed.

In addition to traveling seminars, active participation was made in the meetings and advisory service was provided to MAIL and partners. Improvement on technical interaction and exchange of ideas was achieved, and various aspects of cereals research methodologies were discussed; thus making a contribution to improving the quality of research results. Information on crops, nursery and experiment management was provided; thus a contribution was made to obtain more reliable results. Direct

involvement and supervision of activities resulted in improvement of quality of research results.

CIMMYT-Afghanistan managed and conducted several internal seminars/workshops and training to improve the technical skill and knowledge of the collaborators' agriculture staff as well as of civil employees of MAIL. Furthermore, the project contributed to the building of human capacity in Afghanistan through formal training courses and/or workshops, informal day-to-day coaching and technical support through mentoring, and on-the-job training.

**The following activities were conducted:**

- Jointly with ARIA and other partners, on-the-job training focusing on regular field visits to make technical observations on crop performance, score reactions to diseases rusts and selection of promising lines;
- Monitoring activities by project personnel to address technical problems in conducting trials and nurseries. This monitoring activity is done in a participatory way, with the project team leader assisting the partners to recognize the problems, discuss and find or suggest practical solutions;
- Everyday activities at the research stations were conducted hand in hand with ARIA, thus enhancing the NARS capacity using learning by doing approach;
- Technical information was provided in the form of reports, training manuals and field guides. When necessary, these learning tools were translated in Dari;
- Traveling seminars, meetings and field visits, in Kabul, Nangarhar, Baghlan, Kunduz, Takhar, Herat and Balkh provinces, with the attendance of agriculture staff, policy makers, donors and partners enhanced technical interactions sharing knowledge.
- Open door policy on the sites, where interested farmers can visit the research sites on station and on farm in Balkh, Baghlan, Kunduz and Takhar, and providing information on the trials; and
- Formal and informal training targeted specifically at young scientists and staff in the ARIA and from partners.

In addition to these informal activities, technical workshops and traveling seminars were organized. The details of these workshops and number of participants are described below.

**Traveling Seminars on Wheat Improvement January-June 2009**

NO	Location	Date	No of Participants	Participants' Organizations
1	Nangarhar	Jan 22, 2009	8	ARIA, FAO, CIMMYT
2	Kabul	30 Jan, 2009	10	ARIA, IFDC, CIMMYT
3	Kabul	31 Jan, 2009	10	ARIA, CIMMYT
4	Nangarhar	April 22, 2009	8	ARIA, FAO, CIMMYT
5	Kabul	April 31, 2009	8	ARIA, CIMMYT
6	Nangarhar	May 13, 2009	5	ARIA, CIMMYT
7	Baghlan, Kunduz, Takhar	May 2-5, 2009	8	ARIA, CIMMYT
8	Baghlan, Kunduz, Takhar	May 18-21, 2009	10	ARIA, ICARDA, FAO, CIMMYT
9	Baghlan	June 18, 2009	7	ARIA, CIMMYT
10	Kabul	June 07, 2009	8	ARIA, CIMMYT

11	Kabul	08.06.2009	8	ARIA, CIMMYT
12	Kabul	15.06.2009	10	AIRA, CIMMYT

### **Workshop:**

Workshop organized on “**Optimizing and Protecting Wheat Productivity on Afghan Farms- accelerating identification and adoption of Ug99 resistant high yielding varieties and improved management practices by afghan farmers**”. February 21-23, 2010. Kabul, Afghanistan. A total of 45 participants from MAIL, partners and donors attended.

### **Training arrangement abroad International Conferences and Workshops for Afghan Participants**

The following ARIA and MAIL technical staff have benefited from the training abroad:

1. Abdul Qayum Naemi. Breeding Maize for Rainfed Environment. 31 August-5 Sept, 2009. Hyderabad, India.
2. Abdul Mohammad. Breeding Maize for Rainfed Environment. 31 August-5 Sept, 2009. Hyderabad, India.
3. Habib-Ur-Rahman Naeemy Training workshop on surveillance and monitoring of wheat rust from 25<sup>th</sup> Feb- 6<sup>th</sup> March 2010 in India.
4. Ahmad Shah Stanikzai. Wheat Improvement and Pathology Hand on Training Program. February 15-May 14, 2010. CIMMYT, El Batan and Obregon, Mexico.
5. Dr M. Aziz Osmanzai. BGRI 2010 Technical Workshop, May 30-31, 2010. 8th International Wheat Conference, June 1-4, 2010, Saint Petersburg, Russia.
6. Abdul Ghafour Baberi. BGRI 2010 Technical Workshop, May 30-31, 2010. 8th International Wheat Conference, June 1-4, 2010, Saint Petersburg, Russia.
7. Ghaisuden Ghanizada. 4th International Soil Born Pathogen of Cereals June 21-July 3, 2010. Ankara, Turkey.