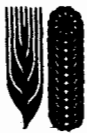


CIMMYT-ICARDA
Results of the Twelfth
International Barley Observation
Nursery (IBON) 1984-1985





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**GLOSSARY OF ABBREVIATIONS AND UNITS OF MEASURE
GLOSARIO DE ABREVIATURAS Y UNIDADES DE MEDICION
GLOSSAIRE DES ABRÉVIATIONS ET UNITÉS DE MESURE**

Abbreviation	Scientific name	Variable name(scale)	Nombre de la variable (escala)	Nom de la variable (échelle)
AL TOL	-	Aluminum tolerance (0-9 scale)	Tolerancia al aluminio (escala 0-9)	Tolérance à l'aluminium (échelle 0-9)
ALT B	<i>Alternaria triticina</i>	Alternaria leaf blight (0-9 scale)	Tizón por alternaria (escala 0-9)	Alternaria (échelle 0-9)
ANT DMGE	-	Ant damage (percentage)	Porcentaje de daño por hormigas	Dégat du aux fourmis en pourcentage
APHD DMGE	-	Aphid damage (percentage)	Porcentaje de daño por áfidos	Dégat du aux pucerons en pourcentage
ARMY WORM	-	Army worm damage (percentage)	Porcentaje de daño por gusano cogollero	Dégat du aux noctuelles en pourcentage
BAC S	<i>Xanthomonas campestris</i> pv. translucens	Bacterial leaf streak or stripe (0-9 scale)	Rayado bacteriano y pajilla negra (escala 0-9)	Rayure bactérienne (échelle 0-9)
BAC SP	-	Bacterial species	Especies bacterianas	Espices bactériennes
BAC B	<i>Pseudomonas syringae</i> pv. striafaciens	Bacterial blight (0-9 scale)	Tizón bacteriano de la hoja (escala 0-9)	Brulure bactérienne des feuilles (échelle 0-9)
BAR S	<i>Pyrenophora graminea</i> (syn. <i>Drechslera gramineum</i> , syn. <i>Helminthosporium gramineum</i>)	Barley stripe (0-9 scale)	Mancha estriada de la cebada	Taches brunes de l'orge (<i>Helminthosporium gramineum</i>) (échelle 0-9)
BIRD DMGE	-	Bird damage (percentage)	Porcentaje de daño por pájaros	Dégat du aux oiseaux en pourcentage
BW	-	Bread wheat	Trigo	Blé
BYDV	-	Barley yellow dwarf virus (0-9 scale)	Virus del enanismo amarillo de la cebada (escala 0-9)	Jauinisse nanisante de l'orge (échelle 0-9)
CHECK MARK	-	Selected for further investigation	Seleccionada para investigación adicional	Selectionnée pour recherche additionnelle
COVD SMUT	<i>Ustilago hordei</i> (<i>U. kollerii</i>)	Covered smut (percentage)	Porcentaje de carbón cubierto	Charbon couvert en pourcentage
EARS/M2	-	Ears per square meter	Espigas por metro cuadrado	Epis par mètre carré
FALL NO	-	Falling number (seconds)	Actividad alfa amilasa (segundos)	Activité de l'alpha amylase (en secondes)
FERT %	-	Fertility (percentage)	Porcentaje de fertilidad	Fertilité en pourcentage
FRST DMGE	-	Frost damage (percentage)	Porcentaje de daño por heladas	Dégat du au gel en pourcentage
FUS N	<i>Fusarium nivale</i> (syn. <i>Monographella nivalis</i>)	Fusarium leaf blotch (0-9 scale)	Mancha de la hoja y moho níveo (moho blanco) (escala 0-9)	Tache de la feuille (<i>Fusarium nivale</i>) (échelle 0-9)
GERM %	-	Germination (percentage)	Porcentaje de germinación	Germination en pourcentage
HAIL DMGE	-	Hail damage (percentage)	Porcentaje de daño por granizo	Dégat du à la grêle en pourcentage
HEAD DAYS	-	Number of days to heading	Número de días al espigamiento	Nombre de jours à l'épiaison
HEL SP	<i>Helminthosporium</i> spp.	Helminthosporium (0-9 scale)	Helminthosporium (escala 0-9)	Helminthosporium (échelle 0-9)
L FIRE	-	Leaf fire (0-9 scale)	Tizón foliar (escala 0-9)	Sécheresse des feuilles (échelle 0-9)
LEAF RUST	<i>Puccinia recondita</i>	Wheat leaf rust (Cobb scale)	Roya de la hoja-trigo (escala de Cobb)	Rouille brune du blé (échelle de Cobb)
LEAF RUST	<i>Puccinia hordei</i>	Barley leaf rust (Cobb scale)	Roya de la hoja-cebada (escala de Cobb)	Rouille brune de l'orge (échelle de Cobb)
LODG %	-	Lodging (percentage)	Porcentaje de acame (vuelco)	Verse en pourcentage
LSE SMUT	<i>Ustilago nuda</i> (<i>U. tritici</i>)	Loose smut (percentage)	Porcentaje de carbón volador	Charbon nu en pourcentage
MAT DAYS	-	Number of days to maturity	Número de días a la madurez	Nombre de jours à la maturation
MOIST %	-	Moisture (percentage)	Porcentaje de humedad	Humidité en pourcentage
NECK BRK	-	Neck breakage (percentage)	Porcentaje de rotura de cuello	Cassure du pédoncule en pourcentage
NET B	<i>Pyrenophora teres</i> (syn. <i>Drechslera teres</i> , syn. <i>Helminthosporium teres</i>)	Net blotch (0-9 scale)	Mancha reticulada (escala 0-9)	Helminthosporium de l'orge (échelle 0-9)
NOBS	-	Number of observations	Número de observaciones	Nombre d'observations
OFS	-	Free State Streak	Estriado del estado libre	Rayure Free State
PC	-	Percentage	Porcentaje	Pourcentage
PLNT DENS	-	Plant density (stems/m2)	Densidad de plantas (tallos/m2)	Population de plantes (tiges/m2)
PLNT HT	-	Plant height (cm)	Altura de planta (cm)	Hauteur (cm)
POW M	<i>Erysiphe graminis</i>	Powdery mildew (0-9 scale)	Oídio o cenicilla polvorienta (escala 0-9)	Oïdium (échelle 0-9)
PROT %	-	Protein (percentage)	Porcentaje de proteína	Protéine en pourcentage
SCAB %	<i>Fusarium</i> spp.	Head scab (percentage)	Porcentaje de roña	Fusarium de l'épi en pourcentage
SCLD	<i>Rhynchosporium secalis</i>	Scald (0-9 scale)	Escaldadura (escala 0-9)	Rhynchosporium (échelle 0-9)
SDMT INDX	-	Sedimentation index (cc)	Índice de sedimentación (cc)	Indice de sédimentation (cc)
SEP N	<i>Leptosphaeria nodorum</i> (syn. <i>Septoria nodorum</i>)	Septoria glume blotch (0-9 scale)	Tizón de la gluma (escala 0-9)	Septoria nodorum (échelle 0-9)
SEP P	<i>Septoria passerinii</i> sacc.	Septoria leaf blotch (barley)	Mancha foliar (cebada)	Tache septoriaenne des feuilles de l'orge
SEP S	<i>Septoria</i> spp.	Septoria glume/leaf blotch (0-9 scale)	Septoria (escala 0-9)	Septoria (échelle 0-9)
SEP T	<i>Mycosphaerella graminicola</i> (syn. <i>Septoria tritici</i>)	Septoria leaf blotch (0-9 scale)	Mancha foliar o tizón foliar (escala 0-9)	Septoria tritici (échelle 0-9)
SHTR %	-	Shattering, head (percentage)	Porcentaje de desgrane (espiga)	Egrenage en pourcentage
SL	-	Sea level	Nivel del mar	Niveau de la mer
SPT B	<i>Cochliobolus sativus</i> (syn. <i>Bipolaria sorokiniana</i> , syn. <i>Helminthosporium sativum</i>)	Spot blotch (0-9 scale)	Tizón foliar (escala 0-9)	Tache de la feuille (<i>Helminthosporium sativum</i>) (échelle 0-9)
STEM RUST	<i>Puccinia graminis</i>	Stem rust (Cobb scale)	Roya del tallo (escala de Cobb)	Rouille noire (échelle de Cobb)
STRP RT.H	<i>Puccinia striiformis</i>	Stripe rust, head (percentage)	Porcentaje de roya amarilla (espiga)	Rouille jaune sur épi en pourcentage
STRP RT.L	<i>Puccinia striiformis</i>	Stripe rust, leaf (Cobb scale)	Roya amarilla-hoja (escala de Cobb)	Rouille jaune sur feuilles (échelle de Cobb)
STRP V	-	Barley stripe mosaic virus (scale 0-9)	Virus del mosaico lineal de la cebada (escala 0-9)	Mosaïque striée de l'orge (échelle 0-9)
TAN S	<i>Pyrenophora tritici-repentis</i> (syn. <i>Helminthosporium tritici-repentis</i>)	Tan spot (0-9 scale)	Mancha foliar amarilla (escala 0-9)	Helminthosporium tritici (échelle 0-9)
Tcl	-	Triticale	Triticale	Triticale
TEST WT	-	Test weight (kg/hl)	Peso hectolítrico (kg/hl)	Poids spécifique (kg/hl)
1000 G.W.	-	1000-grain weight (g)	Peso de 1000 granos (g)	Poids de 1000 grains (g)
VAR	-	Variety	Variación	Variété
VTY	-	Variety	Variación	Variété
YELL BERR	-	Yellow berry (percentage)	Porcentaje de panza blanca	Mitadinage en pourcentage
YIELD KG/HA	-	Yield (kg/ha)	Rendimiento (kg/ha)	Rendement (kg/ha)

Introduction to the Twelfth International Barley Observation Nursery

Hugo Vivar and Maximino Alcalá^{1/}

Methodology

The Twelfth International Barley Observation Nursery (IBON) was sent in September 1984 to be grown by cooperators in their spring season of 1985. Ninety-six nurseries went to cooperators in 78 countries. The 150 advanced lines and checks in the nursery had been chosen from among best materials. All had been grown and observed by scientists under a high yield environment with pressure from major diseases on the CIANO Experiment Station in the Yaqui Valley in northwest Mexico. Here, too, seed for this international nursery was multiplied, cleaned and treated with insecticide and organic fungicide before shipment.

Instructions on nursery management accompanied the mailing of seeds to each cooperator. Enough seed from each line was provided for a single row, unreplicated, of at least 2 m in length. A field book was included with each nursery set, providing a standard format for recording data desired by CIMMYT-ICARDA. In receiving and processing the data returned by cooperators, CIMMYT-ICARDA assumes that the nursery was properly handled and that accurate results were reported. We cannot, however, attest to the rigor with which the trials were grown and results were obtained.

Forty-one of the cooperators receiving the nursery returned field books with performance data at their locations in time to be included in this report. The choice of variables measured and the data returned rests with the individual cooperator. We have included in this summary selected variables reported to us. The number of observations differs from variable to variable. The reader is urged to note the number of observations at the head of each variable column in the summary table (Table 2); this may be an important indicator of the level of credibility that should be inferred. The reader should also bear in mind that the yield reported is from a single plot, essentially grown for observation rather than as a rigorous, replicated yield trial.

Presentation of results—So that data in this report will be of optimal use to the reader, we present the results in three forms:

1. One *international summary*, listing the sites from which data were returned, with notations of all variables recorded and reported.
2. A table reporting the *means of all observations* from sites with uniform and discrete data for each variable measured for each line in the nursery.
3. Selected tables reporting the *best performance by individual lines* on major variables, usually the top 5 to 10 percent. The table of contents lists all variables reported in this way.

Cooperators were asked to use agronomic and disease reporting methodology as described in the "Instructions for the Management and Reporting of Results for the

CIMMYT Wheat Program International Nurseries." Data reported are simple means computed from those supplied by the cooperators. Data on rusts recorded by the modified Cobb scale were converted to average coefficients of infection (ACI) as explained below.

Cooperator participation—Feedback information of two kinds from cooperators is vital to the quality of this and other CIMMYT-ICARDA international nursery reports: first, the prompt return of carefully recorded data from each and every trial site; second, identification of environmental and management factors (e.g. moisture problems, birds, etc.) that become part of our cooperator's station file. We ask for feedback of both kinds.

Rust scoring—Disease scores for stem, leaf and stripe rust infections recorded in the manner recommended by Dr. W.Q. Loegering (USDA International Spring Wheat Rust Nursery, 1959) are converted to a numeric coefficient of infection (CI) prior to being used in any calculations. Each original reading recorded in this manner consists of severity (percentage of rust infection on the plants) and response (kind of infection) scores. Severity is recorded as percent of infection according to the modified Cobb scale. If only a trace is visible, T or TR may be reported and is given the value of 1 percent.

Responses may be recorded by using one of the following codes. The numeric values assigned to these codes are shown at the right.

Response	Equivalent numeric value
VR	0.2
R	0.2
MR	0.4
M or X	0.6
MS	0.8
S	1.0
VS	1.0

Severity and response are recorded together, with severity first (for example, 5MR). The equivalent coefficient of infection is calculated by multiplying the numeric equivalents of each part. For example:

Disease score	Coefficient of infection
5MR	5(0.4) = 2.0
TR	1(0.2) = 0.2
TRR	1(0.2) = 0.2
60S	60(1.0) = 60.0
0*	(0)(0) = 0.0

* If there is no visible infection on the plant, only a zero is reported.

^{1/} Head, ICARDA barley program and head, international nurseries

Reactions may be more variable than can be represented by a single severity and response reading. This variability may be recorded in two ways: 1) A comma or slash indicates plants have segregated into clear-cut classes. The first rating reported is included in the computations. 2) If a range of reactions is recorded, it is denoted by a dash. In these cases the coefficient of infection is the average of the two scores. Examples of these situations are given below:

Disease score	Coefficient of infection
5R,40S	The first rating 5R = 5(0.2) = 1.0 is used in all computations
40M/60S	The first rating 40M = 40(0.6) = 24.0 is used in all computations
15R-5S	$[15(0.2) + 5(1.0)]/2 = 4.0$

A range may be reported for severity only or response only. In each of these cases the average severity or average response is calculated before multiplying the two together. For example:

Disease score	Coefficient of infection
10-20MS	$[(10 + 20)/2] (0.8) = 12.0$
40MR-MS	$40[(0.4 + 0.8)/2] = 24.0$
5-10MR-R	$[(5 + 10)/2][(0.4 + 0.2)/2] = 2.25$

In most tables only average coefficients of infection (ACI) are reported. However, in some tables the highest rust readings (HR) may be reported as severity/response scores.

Table 1. Locations from which data were reported, with variables reported

LOCATIONS	CONTINENT	COUNTRY	AREA	VARIABLES INCLUDED
1	AFRICA	ALGERIA	CONSTANTINE	1 9 50
2	AFRICA	MALAWI	CENTRAL PROV. (DEDZA DIST)	69 77
3	AFRICA	SOUTH AFRICA	CAPE PROVINCE	3 7 50 66 69
4	AFRICA	SOUTH AFRICA	CAPE PROVINCE-TYGERHOEK	7 50 66
5	AFRICA	TANZANIA	ARUSHA	50
6	AFRICA	TANZANIA	E. AFRICA	7 50
7	AFRICA	TANZANIA	MBEYA-U. A. C.	68 69
8	AFRICA	TANZANIA	MBEYA-UYOLE	3 50 66
9	AFRICA	TUNISIA	TUNIS-BEJA	7
10	AFRICA	ZIMBABWE	HARARE-QWEBI	1 3 50
11	AFRICA	ZIMBABWE	HARARE-UNIV. OF ZIMBABWE	1
12	ASIA	AFGHANISTAN	KUNDUZ	50
13	ASIA	CHINA	HEILONGJIANG	1 3 50 66 77
14	ASIA	CHINA	SICHUAN	1 3
15	ASIA	PAKISTAN	PUNJAB-NIAB	3 4 9 50
16	ASIA	PAKISTAN	SIND	1 3 9
17	ASIA	REP. OF KOREA	SUMON GYEDNGGI PROV.	3 61
18	ASIA	SRI LANKA	UPPER UVA	1 3 50 68
19	ASIA	TAIWAN	TAICHUNG	1 3
20	ASIA	THAILAND	NAKHON RATCHSIMA	9 50
21	CENTRAL AMERICA	COSTA RICA	ALAJUELA-FRAIJANES	1 3 4 9 50
22	CENTRAL AMERICA	GUATEMALA	GUEZALTENANGO	1 2 3 4 9
23	EUROPE	CZECHOSLOVAKIA	CZECHIA	3 9 50 61
24	EUROPE	ENGLAND	NORFOLK	61 69
25	EUROPE	GERMAN DEM. REP.	MAGDEBURG-HADMERSLEBEN	7 61
26	EUROPE	GREECE	THESSALONIKI	1 3 5 9 61
27	EUROPE	HUNGARY	MARTONVASAR	1 9 61
28	EUROPE	ITALY	MARCHE	3 61
29	EUROPE	NORWAY		3 50 61
30	EUROPE	PORTUGAL	ELVAS	3 9 50
31	EUROPE	SPAIN	LLEIDA	50
32	MIDDLE EAST	CYPRUS	LAXIA	1 7 9 50 61 66 68 69
33	MIDDLE EAST	IRAN	TEHRAN	1 3 50
34	MIDDLE EAST	QATAR	BARADA	1 3 4 9 10 50 66
35	MIDDLE EAST	TURKEY	SAKARYA	3 7 61
36	NORTH AMERICA	MEXICO	B. C. NORTE-CAEMEXI	1 3 50
37	NORTH AMERICA	MEXICO	EL BATAN	3 7 69
38	NORTH AMERICA	MEXICO	NUEVO LEON-NAVIDAD	1 3 4 9 50
39	NORTH AMERICA	MEXICO	TOLUCA	69
40	NORTH AMERICA	U. S. A.	MONTANA	66 69
41	OCEANIA	NEW ZEALAND	MANAWATU	50 77

*VARIABLE IDENTIFICATIONS

1	YIELD	KG/HA	2	TEST	WT	3	HEAD	DAYS	4	MAT	DAYS	5	STRP	RT. L
7	LEAF	RUST	9	PLNT	HT	10	LDG	%	50	CHECK	MARK	61	POW M	0-9
66	NET B	0-9	68	SPT B	0-9	69	SCLD	0-9	77	BYDV	0-9			

Table 2. Summary of means of all variables

VTY NO.	VARIETY OR CROSS AND PEDIGREE	GRAIN	ORIGIN	YIELD KG/HA	TEST WT.	HEAD DAYS	MAT DAYS	STRP RT. L	LEAF RUST	PLNT HT	NUMBER OF OBSERVATIONS:									
											(17)	(1)	(23)	(5)	(1)	(8)	(13)			
1	PCHO CMB77A-1266-2B-1Y-1B-1Y-1B-0Y			4268.7	47.0	87.0	123.6	2.0	21.8	69.6										
2	TLLD CMB74A-432-25B-1Y-1B-1Y-0B			4421.6	47.0	87.1	121.0	2.0	58.9	70.5										
3	ALAMO"S" CMB77-1585-E-2Y-1B-1Y-1B-2Y-0B			4015.0	40.0	80.3	116.0	4.0	43.3	67.5										
4	ARUPD"S" CMB79-1312-F-3Y-1B-2Y-1B-1Y-0B			3928.9	47.0	86.8	115.3	4.0	22.6	52.5										
5	GLDA"S" CMB79-376-1Y-3B-2Y-1B-2Y-0B			3862.6	49.0	91.5	116.0	2.0	20.3	65.0										
6	CON"S"-COLLD"S" CMB80A-56-4B-1Y-1H-0Y			4101.1	52.0	80.1	110.4	2.0	25.3	60.6										
7	CON"S"-COLLD"S" CMB80A-56-4B-1Y-2H-0Y			3392.4	56.0	80.4	110.0	2.0	24.0	61.0										
8	ASE-2CM X B. 6. 5. B. B/API-CM67 X ORE CMB80A-887-1B-1Y-3H-0Y			3090.6	50.0	78.8	113.2	0.0	35.8	64.3										
9	F3 BULK HIP-H272 CMB80-409-7B-2Y-3H-0Y			3604.4	49.0	81.1	114.2	2.0	45.3	59.7										
10	F3 BULK HIP-H272 CMB80-409-12B-2Y-3H-0Y			3394.8	55.0	82.5	116.0	2.0	34.9	66.9										
11	ROBUR-BREA"S" X F3 BULK HIP CMSWB80A-869-D-3B-2Y-4H-0Y			3265.9	54.0	79.7	115.2	0.0	27.5	62.1										
12	ROBUR-BREA"S" X F3 BULK HIP CMSWB80A-869-D-3B-2Y-5H-0Y			3503.3	49.0	80.8	114.4	4.0	26.9	63.2										
13	ROBUR-BREA"S" X F3 BULK HIP CMSWB80A-869-D-3B-2Y-6H-0Y			3401.0	43.0	80.1	113.6	4.0	34.3	64.3										
14	ROBUR-BREA"S" X F3 BULK HIP CMSWB80A-869-D-3B-2Y-7H-0Y			3319.2	50.0	79.9	110.0	2.0	27.3	62.0										
15	NOPAL"S"-CON"S" CMB80-81-11Y-2B-1Y-2H-0Y			2982.7	51.0	78.5	110.2	4.0	23.9	64.9										
16	NOPAL"S"-CON"S" CMB80-81-11Y-2B-1Y-3H-0Y			3451.6	51.0	78.1	113.0	0.0	22.6	67.8										
17	F3 BULK HIP X MINN480-GVA CMB80-26-1Y-1B-2Y-1H-2Y-0B			3014.1	48.0	81.5	113.4	4.0	28.8	64.4										
18	F3 BULK HIP X MINN480-GVA CMB80-26-1Y-1B-2Y-2H-1Y-0B			2972.5	50.0	80.6	112.8	4.0	40.8	62.7										
19	NOPAL"S"-CON"S" CMB80-81-11Y-2B-1Y-1H-1Y-0B			2888.0	48.0	78.4	112.0	10.0	31.0	65.7										
20	NOPAL"S"-CON"S" CMB80-81-11Y-2B-1Y-4H-2Y-0B			3465.6	50.0	77.2	108.6	2.0	20.5	68.2										
21	CEL-MCU3080 CMB80A-638-2B-1Y-1H-0Y			3431.5	47.0	82.2	108.4	8.0	25.0	72.5										
22	CEL-MCU3080 CMB80A-638-2B-1Y-2H-0Y			3097.6	52.0	82.6	114.6	8.0	20.3	70.0										
23	MINN480-GVA X LOCAL BARLEY CMB80-382-9B-1Y-1H-0Y			3787.1	49.0	87.2	114.4	0.0	33.9	70.5										
24	(H8855-467 X GRAUPERKORN/PYD-CAM X AVT-RM150B)AS46-KRISTINA/APH-DWARF2 X POR-IB65 CMSWB80A-693-E-1B-1Y-1H-0Y			3102.1	51.0	83.9	110.2	4.0	32.9	63.0										
25	BREA"S"-F3 BULK HIP CMB80-53-9Y-1B-1Y-0Y			3181.7	50.0	81.2	112.8	6.0	12.1	70.2										
26	BREA"S"-F3 BULK HIP CMB80-53-9Y-1B-1Y-2H-0Y			3084.6	49.0	80.2	112.0	5.0	9.7	71.6										

VTY	LODG %	CHECK MARK	PDW M 0-9	NET B 0-9	SPT B 0-9	SCLD 0-9	BYDV 0-9
	(1)	(23)	(10)	(7)	(3)	(8)	(3)
1	5.0	21.7	6.1	4.3	4.0	2.7	3.0
2	5.0	13.0	6.7	3.3	3.5	3.5	3.3
3	0.0	17.4	5.9	3.2	3.5	5.4	3.3
4	0.0	17.4	5.0	5.2	3.0	6.4	1.3
5	0.0	30.4	3.9	5.0	3.5	6.0	3.3
6	20.0	26.1	6.0	4.0	6.0	2.9	3.5
7	20.0	17.4	5.4	5.2	6.0	2.1	5.0
8	30.0	21.7	5.4	4.7	3.0	3.6	3.3
9	40.0	0.0	6.5	4.8	4.7	2.0	3.0
10	20.0	17.4	5.1	5.0	3.3	10.4	1.0
11	10.0	17.4	6.7	3.9	5.0	11.0	2.3
12	10.0	17.4	6.8	4.0	6.3	9.9	5.0
13	0.0	21.7	7.6	5.2	4.7	4.5	4.0
14	0.0	17.4	6.8	5.3	4.3	4.0	3.7
15	0.0	13.0	5.1	5.7	6.0	1.4	3.7
16	0.0	26.1	4.4	5.4	6.7	1.5	4.3
17	0.0	8.7	5.2	5.2	5.7	4.0	2.5
18	0.0	4.3	4.9	5.0	6.7	5.3	2.5
19	10.0	21.7	5.7	5.0	6.7	2.0	4.0
20	15.0	13.0	5.3	6.2	5.7	2.4	5.0
21	5.0	13.0	5.2	4.2	4.3	4.6	3.3
22	0.0	13.0	5.1	5.2	4.3	3.4	1.7
23	0.0	21.7	5.1	5.7	6.7	3.6	2.7
24	0.0	8.7	7.0	4.1	5.0	4.9	2.0
25	0.0	17.4	6.7	5.5	4.3	5.4	4.0
26	5.0	17.4	6.4	5.7	3.7	5.1	3.3

Table 2. (continued)

VTY NO.	VARIETY OR CROSS AND PEDIGREE	GRAIN	ORIGIN	YIELD KG/HA	TEST WT	HEAD DAYS	MAT DAYS	STRP RT. L	LEAF RUST	PLNT HT	NUMBER OF OBSERVATIONS:						
											(17)	(1)	(23)	(5)	(1)	(8)	(13)
27	BREA"S"-F3 BULK HIP CMB80-53-9Y-1B-1Y-3H-0Y			3250.6	49.0	81.2	112.4	4.0	16.0	68.4							
28	BREA"S"-F3 BULK HIP CMB80-53-9Y-1B-1Y-4H-0Y			3070.9	48.0	81.5	113.4	4.0	18.0	71.2							
29	BOYACA(2)-SURBATA(3) X SD729-POR CMB80-100-1Y-2B-1Y-4H-0Y			2954.3	45.0	83.0	113.6	2.0	36.7	70.2							
30	M64.69-M65.211 X XV2240/RM150B-11012 2 X BCO. MR CMB80-22-6Y-1B-1Y-3H-1Y-0B			3027.2	47.0	81.5	115.4	4.0	24.1	70.8							
31	BREA"S"-F3 BULK HIP CMB80-53-9Y-1B-1Y-3H-1Y-0B			3294.8	46.0	83.3	113.8	6.0	14.4	69.7							
32	BREA"S"-F3 BULK HIP CMB80-53-9Y-1B-1Y-3H-2Y-0B			3189.4	48.0	82.7	113.4	0.0	11.7	69.8							
33	NOPAL"S"-CON"S" CMB80-81-11Y-2B-1Y-2H-1Y-0B			3219.6	45.0	78.8	109.8	4.0	21.5	64.4							
34	NOPAL"B"-CON"S" CMB80-81-11Y-2B-1Y-2H-2Y-0B			3487.1	43.0	79.6	110.5	2.0	25.7	70.4							
35	NOPAL"S"-CON"S" CMB80-81-11Y-2B-1Y-3H-1Y-0B			3583.5	45.0	79.5	110.0	8.0	16.8	71.9							
36	NOPAL"S"-CON"S" CMB80-81-11Y-2B-1Y-3H-2Y-0B			3681.8	53.0	78.8	113.4	2.0	15.4	66.7							
37	NOPAL"S"/API-CH67 X AQER CMB80-82-10Y-1B-1Y-1H-1Y-0B			3281.7	50.0	86.0	115.0	8.0	29.3	62.8							
38	BOY(2)-SURB(3) X SD729-POR CMB80-100-1Y-2B-1Y-4H-2Y-0B			3269.4	52.0	84.6	112.2	2.0	31.8	65.7							
39	BREA"S"-F3 BULK HIP CMB80-53-9Y-1B-1Y-2H-1Y-0B			2976.3	45.0	81.1	116.4	2.0	14.2	65.8							
40	BREA"S"-F3 BULK HIP CMB80-53-9Y-1B-1Y-2H-2Y-0B			3544.8	49.0	81.3	111.8	4.0	12.5	66.9							
41	BREA"S"-F3 BULK HIP CMB80-53-9Y-1B-1Y-4H-1Y-0B			3293.4	49.0	83.0	115.0	0.0	39.3	68.6							
42	BOY(2)-SURB(3) X SD729-POR CMB80-100-1Y-2B-1Y-2H-1Y-0B			3516.4	49.0	82.8	116.6	0.0	41.8	71.8							
43	BOY(2)-SURB(3) X SD729-POR CMB80-100-1Y-2B-1Y-3H-1Y-0B			3397.9	49.0	83.1	113.2	0.0	32.9	71.2							
44	(GAL X (KI-CI 2376)(2)/EN)API-CH67 X POR-U SASK1800 CMB80-94B-A-1Y-3B-1Y-8H-1Y-0B			3486.4	44.0	86.8	115.2	0.0	25.0	75.8							
45	EN-4BN 73B/AQER X API-CH67 CMB79A-156B-B-6Y-1B-2Y-1H-2Y-0B			3600.7	48.0	81.6	112.0	0.0	20.9	74.7							
46	(BEACON-BREA"S" X CM67/CEL)GAL-PI63B CMB79A-643-5Y-1B-2Y-1H-1Y-0B			3570.8	41.0	86.7	116.0	0.0	24.0	76.4							
47	COSSACK X ESPERANCE-180B CMSWB80A-346-3B-1Y-1B-1Y-0B			2901.0	52.0	95.1	118.8	6.0	18.8	78.9							
48	BEACON-BREA"S"[(AQER/CI3909 2 X M66 51-MANKER)BREA"S"-CEL] CMB81A-53-7B-1Y-0M			3926.9	52.0	98.1	104.0	2.0	30.5	71.1							
49	GLORIA"S"-CELO"S" CMB81A-614-4B-2Y-0M			4284.6	46.0	87.7	115.8	4.0	22.6	67.2							
50	GLORIA"S"-CELO"S" CMB81A-614-4B-4Y-0M			3833.6	45.0	90.5	114.2	12.0	28.1	65.8							
51	GLORIA"S"-CELO"S" CMB81A-614-8B-1Y-0M			3576.9	56.0	91.6	116.6	4.0	28.3	70.5							
52	ALAMO"S"/MANKER-SLR X CP CMB81A-639-2B-1Y-0M			3663.9	50.0	83.1	115.6	6.0	20.4	71.1							
53	11012.2-MZG X CEL[(M65.157-M66.69.1 X MONA/A557)ABNJMZG-GVA] CMB81-152-4Y-1H-2Y-0M			3526.4	51.0	80.0	110.8	4.0	27.1	70.7							

VTY	LODG X	CHECK MARK	POW M 0-9	NET B 0-9	SPT B 0-9	SCLD 0-9	BYDV 0-9
	(1)	(23)	(10)	(7)	(3)	(8)	(3)
27	5.0	13.0	6.4	5.3	3.7	5.8	1.7
28	5.0	17.4	6.5	4.1	3.0	4.9	2.3
29	5.0	8.7	6.6	4.7	3.3	3.8	3.0
30	5.0	8.7	6.6	4.1	3.7	4.5	3.3
31	0.0	30.4	6.6	3.7	4.3	3.5	2.3
32	5.0	21.7	6.1	5.3	3.7	4.4	4.7
33	10.0	8.7	5.5	5.0	4.3	2.4	3.5
34	20.0	4.3	5.0	4.7	3.0	2.6	4.5
35	30.0	21.7	5.1	5.1	6.7	2.3	3.0
36	30.0	17.4	5.2	5.0	7.0	3.3	2.3
37	10.0	13.0	4.6	5.5	5.0	3.6	3.0
38	5.0	21.7	6.2	4.7	4.7	2.7	1.5
39	5.0	13.0	5.9	5.3	3.7	3.7	2.7
40	10.0	13.0	6.3	5.3	3.7	4.8	4.7
41	20.0	0.0	6.5	4.0	4.7	4.0	4.0
42	0.0	13.0	6.3	3.8	4.0	4.1	3.0
43	0.0	13.0	6.1	4.0	4.7	4.0	3.0
44	20.0	21.7	6.8	5.2	6.3	3.7	3.7
45	5.0	30.4	3.6	5.8	4.3	3.6	3.3
46	5.0	30.4	7.1	3.3	5.0	3.1	3.7
47	0.0	13.0	4.4	4.7	7.3	3.3	5.0
48	0.0	8.7	5.0	6.0	0.0	5.3	5.0
49	0.0	26.1	6.3	6.0	3.7	2.9	3.3
50	20.0	26.1	6.3	5.6	5.3	3.8	3.3
51	20.0	30.4	6.2	4.1	7.0	1.9	3.3
52	30.0	21.7	6.3	4.6	7.0	2.9	3.3
53	5.0	4.3	6.9	2.9	6.0	2.0	2.7

Table 2. (continued)

VTY NO.	VARIETY OR CROSS AND PEDIGREE	GRAIN	ORIGIN	YIELD KG/HA	TEST WT	HEAD DAYS	MAT DAYS	STRP RT. L	LEAF RUST	PLNT HT	NUMBER OF OBSERVATIONS:						
											(17)	(1)	(23)	(5)	(1)	(8)	(13)
54	11012 2-MZQ X CEL/BREA"S"-BUTTER X F3 BULK HIP CMBB1-153-4Y-1H-1Y-0M			3411.8	47.0	81.3	111.4	4.0	30.0	71.5							
55	GLORIA"S"-COME"S" CMBB1-294-4Y-1H-1Y-0M			3456.7	51.0	91.8	111.5	4.0	35.0	69.3							
56	NOPAL"S"-CON"S" CMBB0-81-11Y-2B-1Y-1Y-0M			3896.7	53.0	78.1	110.2	10.0	27.8	65.4							
57	[(APM-DWARF21 X PDR-IB65/BAL16)NOPAL S"]QLTE"S" CMBB1-922-3B-2Y-0M			2858.9	48.0	92.6	119.2	4.0	43.5	63.3							
58	CIH"S"-QLTE"S" CMBB1-123-11B-2Y-0M			3276.8	51.0	87.9	112.6	8.0	18.6	62.7							
59	CIH"S"-QLTE"S" CMBB1-123-11B-3Y-0M			3488.5	51.0	90.6	112.2	2.0	23.8	66.1							
60	NC110.77-BON(NOPAL/API-CM67 X MZQ) CMSWBB1A-583-B-1B-1Y-0M			3105.8	52.0	88.1	112.8	2.0	16.0	72.2							
61	[[2201-ATHS(SD729-PDR X 72AB58/PYO)] CM67-CENTEND X CAM CMBB1A-2773-A-1B-3Y-0M			3321.9	57.0	87.9	114.4	8.0	20.9	70.3							
62	[[2201-ATHS(SD729-PDR X 72AB58/PYO)] CM67-CENTEND X CAM CMBB1A-2773-A-1B-4Y-0M			3610.4	46.0	85.3	112.8	4.0	21.0	68.9							
63	[[2201-ATHS(SD729-PDR X 72AB58/PYO)] CM67-CENTEND X CAM CMBB1A-2773-A-1B-7Y-0M			3542.9	46.0	85.4	117.0	6.0	25.1	68.1							
64	CACD"S"/API-CM67 X 1594 CMBB1-16B-6Y-3Y-0M			3739.1	46.0	89.2	112.8	4.0	18.7	64.7							
65	CACD"S"/API-CM67 X 1594 CMBB1-16B-6Y-4Y-0M			3418.3	46.0	89.1	113.4	0.0	22.3	67.2							
66	JOSO"S"/MZQ X MASWI-BON CMBB1-1289-1Y-2Y-0M			3453.9	52.0	87.7	119.2	4.0	27.1	72.8							
67	JOSO"S"/MZQ X MASWI-BON CMBB1-1289-1Y-4Y-0M			3940.0	46.0	86.6	118.6	4.0	20.9	72.8							
68	GLDA"S"-EMIR CMBB1A-1111-7B-1Y-0M			3478.9	46.0	91.5	116.2	2.0	24.5	73.4							
69	COSSACK-CARLSBERG II X BREA"S"-RM150 CMSWBB1A-716-A-2B-3Y-0M			3438.7	50.0	90.7	120.6	4.0	16.4	67.5							
70	[GADA"S"(MAGNIFI02-ABN11/PYO-CAM X AVT-RM150B)]MARI-COHO/FRISKA-4839 X 7004 CMBB1A-2254-B-3B-4Y-0M			3242.8	50.0	89.1	121.6	2.0	22.3	73.8							
71	GLDA"S"-EMIR CMBB1A-1111-6B-1Y-0M			3429.5	52.0	93.1	124.2	0.0	18.0	77.2							
72	GLDA"S"-EMIR CMBB1A-1111-7B-3Y-0M			3350.9	48.0	92.9	124.0	2.0	7.9	71.2							
73	GLDA"S"-EMIR CMBB1A-1111-7B-4Y-0M			3145.1	49.0	91.2	122.8	2.0	13.6	74.7							
74	SM4142-NACKTA X PYE"S" CMBB1-1018-8B-2Y-0M			3916.3	53.0	90.0	122.4	4.0	17.5	75.2							
75	F3 BULK HIP-H272 CMBB0-409-14B-1Y-3H-5Y-0M			4151.3	53.0	86.2	115.4	6.0	24.9	64.8							
76	BREA"S"-F3 BULK HIP CMBB0-53-3Y-1B-1Y-1H-2Y-0B			3093.9	50.0	78.9	115.0	6.0	19.3	68.3							
77	BREA"S"-F3 BULK HIP CMBB0-53-3Y-1B-1Y-1H-0Y			2825.5	53.0	79.0	115.2	6.0	24.9	64.8							
78	(CAL. MR X DS-APRO, MZQ-GALT X MINN906 MASWI-BON CMBB0A-1649-A-1B-1Y-1H-0Y			3174.9	46.0	81.5	116.6	6.0	51.6	58.8							
79	GLORIA"S"-CPAL"S" CMBB1-295-18B-6Y-0M			3994.6	46.0	91.7	119.4	24.0	23.3	66.5							

VTY	LODG %	CHECK MARK	POW M 0-9	NET B 0-9	SPT B 0-9	SCLD 0-9	BYDV 0-9
	(1)	(23)	(10)	(7)	(3)	(8)	(3)
54	5.0	8.7	7.6	4.0	6.3	2.7	4.0
55	5.0	17.4	5.8	3.3	0.0	6.5	3.5
56	30.0	17.4	6.1	5.3	7.0	2.6	3.0
57	10.0	17.4	3.4	5.2	7.3	2.3	3.7
58	5.0	8.7	3.9	4.0	7.3	2.0	2.3
59	5.0	17.4	4.3	4.6	6.7	1.7	3.3
60	5.0	13.0	5.9	4.4	6.7	2.0	3.7
61	0.0	13.0	6.4	4.7	7.7	2.0	2.7
62	10.0	17.4	6.3	5.1	7.3	2.0	3.3
63	10.0	13.0	5.1	6.2	7.0	2.0	3.0
64	10.0	21.7	5.9	4.3	5.7	1.6	2.7
65	5.0	26.1	5.7	5.1	6.3	2.0	2.0
66	5.0	26.1	7.5	4.3	7.0	1.6	2.0
67	5.0	30.4	7.4	4.7	7.0	1.6	2.0
68	10.0	34.8	3.2	3.6	6.7	2.1	3.3
69	20.0	21.7	4.6	4.7	5.0	2.0	2.0
70	10.0	21.7	4.8	6.3	7.0	1.9	3.0
71	5.0	13.0	2.7	4.1	6.3	1.4	2.3
72	5.0	17.4	3.3	4.6	5.7	1.4	2.3
73	5.0	26.1	2.8	5.0	6.3	1.6	4.0
74	5.0	21.7	4.6	5.8	6.3	2.6	3.7
75	10.0	26.1	5.9	4.9	7.0	1.6	4.0
76	0.0	17.4	6.9	4.4	6.0	3.1	2.7
77	5.0	17.4	7.0	4.6	6.3	4.0	3.7
78	5.0	8.7	7.1	4.4	3.0	5.3	1.5
79	5.0	34.8	4.3	6.2	5.7	1.9	3.0

Table 2. (continued)

VTY NO.	VARIETY OR CROSS AND PEDIGREE	GRAIN	ORIGIN	YIELD KG/HA	TEST WT	HEAD DAYS	MAT DAYS	STRP RT. L	LEAF RUST	PLNT HT	NUMBER OF OBSERVATIONS:									
											(17)	(1)	(23)	(5)	(1)	(8)	(13)			
80	CEL-XV2240/CHOYA-SALT X 11012.2 CMBBO-341-6Y-2B-1Y-3H-1Y-0B			2804.4	49.0	84.4	116.2	4.0	53.4	67.6										
81	AS			4828.5	51.0	89.4	126.5	6.0	53.9	85.0										
82	AS46			4531.0	41.0	89.4	123.0	4.0	52.1	87.3										
83	OSR			3676.5	46.0	91.3	122.3	6.0	46.4	87.8										
84	ARMELLE			3171.9	45.0	104.4	130.5	2.0	19.1	75.5										
85	MAGNUM			3217.6	51.0	104.0	131.5	4.0	9.0	70.5										
86	JET			2032.4	48.0	90.7	117.2	4.0	75.9	75.7										
87	NN			2599.8	48.0	90.5	114.6	6.0	72.1	86.8										
88	KC CI1296			2885.2	48.0	90.0	119.4	8.0	67.6	93.3										
89	MODOC			2592.5	47.0	98.1	124.8	6.0	70.6	81.2										
90	SUDAN			3006.7	46.0	85.7	119.6	6.0	57.4	87.7										
91	SPECIALE			2323.9	47.0	86.4	118.8	6.0	51.4	75.7										
92	ODERBRUCKER			2240.2	44.0	87.1	119.6	8.0	59.1	90.7										
93	PERUVIAN			2667.3	52.0	96.2	128.3	6.0	10.0	89.9										
94	ARIANA			2357.1	48.0	105.8	131.5	6.0	7.0	84.1										
95	REKAI			2792.4	48.0	93.2	130.0	8.0	27.1	86.2										
96	RICARDO			1930.9	49.0	102.3	132.3	8.0	21.7	84.8										
97	AIM			3304.6	47.0	84.4	119.8	0.0	20.0	68.5										
98	GOLD			3313.5	48.0	90.4	121.4	2.0	37.6	78.2										
99	LECHTALER			2814.7	47.0	90.1	121.2	2.0	56.1	81.6										
100	MAGNIF102			3683.3	50.0	82.8	124.0	4.0	45.0	72.6										
101	GUINN			2934.9	-----	99.4	130.3	6.0	23.2	79.2										
102	BOLIVIA			2305.9	-----	103.3	139.0	8.0	15.2	92.0										
103	CEBADA CAPA			2227.0	-----	107.8	139.3	8.0	6.8	84.0										
104	FORRAJERA KLEIN-RIKA7			3035.9	-----	101.8	128.0	2.0	7.0	85.1										
105	EQYPT4			2560.6	-----	96.0	128.5	6.0	21.8	80.8										
106	ABN			3841.6	-----	87.7	122.3	10.0	29.2	79.2										

VTY	LDDC %	CHECK MARK	POW M 0-9	NET B 0-9	SPT B 0-9	SCLD 0-9	BYDV 0-9
	(1)	(23)	(10)	(7)	(3)	(8)	(3)
80	5.0	4.3	6.4	3.5	4.7	3.0	3.3
81	0.0	26.1	5.8	3.7	5.7	1.9	3.7
82	0.0	30.4	5.7	4.0	5.7	2.1	2.3
83	-----	13.0	5.6	5.0	7.0	2.0	3.0
84	-----	21.7	3.6	4.0	6.0	0.9	3.0
85	-----	8.7	1.9	4.3	4.3	1.9	2.7
86	0.0	8.7	4.6	3.0	5.3	2.4	2.5
87	0.0	17.4	3.6	4.2	5.3	2.5	1.3
88	0.0	8.7	5.6	4.8	5.7	1.5	2.0
89	-----	4.3	5.6	3.5	6.0	2.7	1.0
90	10.0	4.3	6.6	3.3	4.7	4.3	2.7
91	0.0	0.0	6.3	4.2	4.3	4.5	1.3
92	10.0	4.3	6.3	3.2	4.7	3.0	2.7
93	-----	4.3	5.0	5.5	4.3	4.0	3.0
94	-----	0.0	5.1	5.4	4.7	3.9	3.7
95	-----	8.7	5.5	6.0	6.7	3.1	2.3
96	-----	13.0	3.6	4.3	6.3	2.9	1.7
97	0.0	0.0	4.7	3.9	4.7	6.0	3.0
98	0.0	8.7	4.7	5.0	5.0	5.9	2.0
99	0.0	8.7	4.1	5.2	5.0	6.0	3.0
100	0.0	34.8	3.6	4.3	4.0	5.7	2.0
101	-----	13.0	5.9	4.6	6.0	2.0	2.0
102	-----	8.7	5.0	5.6	7.0	1.6	2.3
103	-----	8.7	5.5	5.8	6.0	2.9	3.3
104	0.0	8.7	4.8	5.0	4.7	4.0	3.3
105	0.0	4.3	5.3	3.3	5.0	3.9	4.3
106	5.0	21.7	4.0	5.5	5.0	3.0	1.7

Table 3. Resistance to spot blotch

LOCATIONS	CONTINENT	COUNTRY	AREA	VARIABLES INCLUDED
7	AFRICA	TANZANIA	MBEYA-U. A. C.	6B
18	ASIA	SRI LANKA	UPPER UVA	6B
32	MIDDLE EAST	CYPRUS	LAXIA	6B

*VARIABLE IDENTIFICATIONS
6B SPT B 0-9

Spot Blotch

Three locations (Tanzania, Sri Lanka and Cyprus) reported data on spot blotch. Among the 15 cultivars with lower average across locations, there are no lines that show resistance in all sites. Since no screening for spot blotch is done in Mexico, it is expected that resistance is limited to a low number of entries in the 12th screening nursery.

Table 3. (continued)

VITY NO.	VARIETY OR CROSS AND PEDIGREE	LOCATIONS			MEAN
		7	18	32	
8	ASE-2CM X B. 6. 5 B. B/API-CM67 X DRE CMB80A-887-1B-1Y-3H-0Y	6	2	1	3.0
28	BREA"S"-F3 BULK HIP CMB80-53-9Y-1B-1Y-4H-0Y	0	2	7	3.0
34	NOPAL"S"-CON"S" CMB80-81-11Y-2B-1Y-2H-2Y-0B	0	8	1	3.0
78	(CAL. MR X DS-APRO/MZG-CALT X MINN906 MAGNI-BON CMB80A-1649-A-1B-1Y-1H-0Y	0	2	7	3.0
10	F3 BULK HIP-H272 CMB80-409-12B-2Y-3H-0Y	1	2	7	3.3
29	BOYACA(2)-SURBATA(3) X SD729-PDR CMB80-100-1Y-2B-1Y-4H-0Y	1	2	7	3.3
26	BREA"S"-F3 BULK HIP CMB80-53-9Y-1B-1Y-2H-0Y	0	4	7	3.7
27	BREA"S"-F3 BULK HIP CMB80-53-9Y-1B-1Y-3H-0Y	0	4	7	3.7
30	M64. 69-M65. 211 X XV2240/RM1508-11012 2 X BCO. MR CMB80-22-6Y-1B-1Y-3H-1Y-0B	0	4	7	3.7
32	BREA"S"-F3 BULK HIP CMB80-53-9Y-1B-1Y-3H-2Y-0B	0	4	7	3.7
39	BREA"S"-F3 BULK HIP CMB80-53-9Y-1B-1Y-2H-1Y-0B	0	4	7	3.7
40	BREA"S"-F3 BULK HIP CMB80-53-9Y-1B-1Y-2H-2Y-0B	0	4	7	3.7
49	GLORIA"S"-CELO"S" CMB81A-614-4B-2Y-0M	0	4	7	3.7
42	BOY(2)-SURB(3) X SD729-PDR CMB80-100-1Y-2B-1Y-2H-1Y-0B	1	4	7	4.0
100	MAGNIF102	0	6	6	4.0

Table 4. Resistance to BYDV

LOCATIONS	CONTINENT	COUNTRY	AREA	VARIABLES INCLUDED
2	AFRICA	MALAWI	CENTRAL PROV. (DEDZA DIST)	77
13	ASIA	CHINA	HEILONGJIANG	77
41	OCEANIA	NEW ZEALAND	MANAMATU	77

*VARIABLE IDENTIFICATIONS
 77 BYDV 0-9

BYDV

Three locations from three different countries in different continents submitted data on BYDV. Among the best 20 cultivars with low scores across locations, four scald differential varieties (Modoc, Nigrinudum, Abyssinia, and Kitchin) and four leaf rust varieties with

known Pa genes (Speciale, Ricardo, Gold, and Quinn) were included. This preliminary information, in view of the limited number of locations, needs further confirmation, since most of these lines have never been described as resistant to BYDV.

Table 4. (continued)

VTY NO.	VARIETY OR CROSS AND PEDIGREE	LOCATIONS			MEAN
		2	13	41	
10	F3 BULK HIP-H272 CMB80-409-12B-2Y-3H-0Y	---	1	1	1.0
89	MODOC	---	1	1	1.0
4	ARUPO"S" CMB79-1312-F-3Y-1B-2Y-1B-1Y-0B	2	1	1	1.3
87	NN	1	1	2	1.3
91	SPECIALE	1	1	2	1.3
38	BOY(2)-SURB(3) X SD729-PDR CMB80-100-1Y-2B-1Y-4H-2Y-0B	---	1	2	1.5
78	(CAL. NR X DS-APRO/MZG-GALT X MINN906 MASWI-BON CMB80A-1649-A-1B-1Y-1H-0Y	---	1	2	1.5
22	CEL-MCU3080 CMB80A-638-2B-1Y-2H-0Y	2	1	2	1.7
27	BREA"S"-F3 BULK HIP CMB80-53-9Y-1B-1Y-3H-0Y	0	1	4	1.7
96	RICARDO	1	2	2	1.7
106	ABN	2	1	2	1.7
24	(HBB55-467 X GRAUPERKORN/PYO-CAM X AVT-RM150B)AS46-KRISTINA/APH-DWARF2 X PDR-1865 CMB80A-693-E-1B-1Y-1H-0Y	1	2	3	2.0
65	CACO"S"/API-CH67 X 1594 CMB81-168-6Y-4Y-0M	1	3	2	2.0
66	JOSO"S"/MZG X MASWI-BON CMB81-1289-1Y-2Y-0M	3	1	2	2.0
67	JOSO"S"/MZG X MASWI-BON CMB81-1289-1Y-4Y-0M	1	2	3	2.0
69	COSSACK-CARLSBERG II X BREA"S"-RM150 CMB81A-716-A-2B-3Y-0M	1	2	3	2.0
88	KC CI1296	4	1	1	2.0
98	GOLD	1	2	3	2.0
100	MAGNIF102	---	2	2	2.0
101	GUINN	1	2	3	2.0

Table 5. Resistance to leaf rust

LOCATIONS	CONTINENT	COUNTRY	AREA	VARIABLES INCLUDED
3	AFRICA	SOUTH AFRICA	CAPE PROVINCE	7
4	AFRICA	SOUTH AFRICA	CAPE PROVINCE-TYGERHOEK	7
6	AFRICA	TANZANIA	E. AFRICA	7
9	AFRICA	TUNISIA	TUNIS-BEJA	7
25	EUROPE	GERMAN DEM. REP.	MAGDEBURG-HADMERSLEBEN	7
32	MIDDLE EAST	CYPRUS	LAXIA	7
35	MIDDLE EAST	TURKEY	SAKARYA	7
37	NORTH AMERICA	MEXICO	EL BATAN	7

*VARIABLE IDENTIFICATIONS
7 LEAF RUST

Leaf Rust

Seventeen genotypes reported to carry known Pa genes were included in the nursery, with the objective to survey virulence patterns of *Puccinia hordei* present in barley producing regions. Eight locations reported leaf rust data from four different continents: Africa with four locations in three different countries, Europe and America with one location, and the Middle East with two locations in two countries.

Data on the top 15 entries with low infection across locations are reported, among these genotypes, only five differential varieties are included.

Cebada Capa and Forrajera Klein/RiKa7, both carrying the Pa7 gene, were found among the best resistant genotypes across locations. No information was available from Germany and one of the two South African locations. In Mexico both varieties are known to be resistant to races present in the country (8,19,30). Virulence present in Tunisia and Turkey is capable of producing a moderate susceptible reaction in varieties carrying the Pa7 gene.

The gene Pa2 present in the varieties Ariana and Peruvian provided resistance across locations, except for virulences from Tunisia and Turkey. Although no information from Mexico was available, the Pa2 gene is reported to provide resistance under Mexican conditions.

The Pa6 and Pa2 genes present in the variety Bolivia are not effective against races of the pathogen present in Turkey and Tunisia. Bolivia is resistant in Mexico.

The incorporation of the Pa7 gene in the germplasm developed by the program is of particular interest; for that reason, the frequency of crosses with varieties carrying the Pa7 has increased greatly. Leaf rust screening is done in Mexico using artificially created epidemics with races present in the country.

Table 5. (continued)

VITY NO.	VARIETY OR CROSS AND PEDIGREE	LOCATIONS								MEAN
		3	4	6	9	23	32	35	37	
103	CEBADA CAPA	----	0	0	30MS	----	5HR	10MS	----	6.8
94	ARIANA	----	0	0	30MS	----	10HR	----	----	7.0
104	FORRAJERA KLEIN-RIKA7	----	0	0	40MS	----	5HR	10MS	TR-R	7.0
72	OLDA"S"-ENIR CMBB1A-1111-7B-3Y-0M	TMR-40MS	5R	5MS	20MS	10MS	5HR	20MS	TR	7.9
85	MAGNUM	TMR	5B	0	10HR	10MS	20MS	30S	----	9.0
26	BREA"S"-F3 BULK HIP CMBB0-53-9Y-1B-1Y-2H-0Y	----	0	10MS	20HR	----	25MS	20MS	10MS-HR	9.7
93	PERUVIAN	TMR	0	0	20HR	10MS	10HR	50S	----	10.0
32	BREA"S"-F3 BULK HIP CMBB0-53-9Y-1B-1Y-3H-2Y-0B	5HR	0	0	40MS	----	15MS	20S	TR	11.7
25	BREA"S"-F3 BULK HIP CMBB0-53-9Y-1B-1Y-0Y	----	5R	0	20MS	5MS	30MS	40S	TR	12.1
40	BREA"S"-F3 BULK HIP CMBB0-53-9Y-1B-1Y-2H-2Y-0B	5MS	0	5MS	30MS	20MS	15MS	40S	TR	12.5
73	OLDA"S"-ENIR CMBB1A-1111-7B-4Y-0M	10HR	5B	0	40MS	5MS	5HR	40S	10HR-MS	13.6
39	BREA"S"-F3 BULK HIP CMBB0-53-9Y-1B-1Y-2H-1Y-0B	5MS	0	10B	20MS	10MS	25MS	50S	10MS-HR	14.3
31	BREA"S"-F3 BULK HIP CMBB0-53-9Y-1B-1Y-3H-1Y-0B	TMR	5B	0	50MS	5MS	20MS	50S	TR	14.4
102	BOLIVIA	----	0	0	60MS	----	5HR	10B	----	15.2
36	NOPAL"S"-CON"S" CMBB0-81-11Y-2B-1Y-3H-2Y-0B	25MS	20B	0	20MS	1MS	30S	30B	10MS-HR	15.4

Table 6. Resistance to net blotch

LOCATIONS	CONTINENT	COUNTRY	AREA	VARIABLES INCLUDED
3	AFRICA	SOUTH AFRICA	CAPE PROVINCE	66
4	AFRICA	SOUTH AFRICA	CAPE PROVINCE-TYGERHOEK	66
8	AFRICA	TANZANIA	MBEYA-UYOLE	66
13	ASIA	CHINA	HEILONGJIANG	66
32	MIDDLE EAST	CYPRUS	LAXIA	66
34	MIDDLE EAST	QATAR	BARADA	66
40	NORTH AMERICA	U. S. A.	MONTANA	66

*VARIABLE IDENTIFICATIONS
 66 NET B 0-9

Net Blotch

Data reported for net blotch resistance came from seven locations, three in Africa, two in the Middle East, one in Asia, and one in America.

The location in South Africa (Cape Province) reported high scores that possibly reflect a severe incidence of

net blotch. The variety Jet shows the lowest score of 3 in this location. Jet is known to carry resistance to scald and loose smut.

The Alamo line has scores lower than 3 across all locations except for the South African Cape Province.

Table 6. (continued)

VTY NO.	VARIETY OR CROSS AND PEDIGREE	LOCATIONS							MEAN
		3	4	8	13	32	34	40	
53	11012.2-MZG X CEL((M65.157-M66.69.1 X MONA/AS57)ABNJHZG-OVA) CMB81-152-4Y-1H-2Y-0H	9	0	4	1	0	3	3	2.9
86	JET	3	---	6	---	1	2	3	3.0
3	ALAMO"S" CMB77-1585-E-2Y-1B-1Y-1B-2Y-0B	9	2	3	---	1	2	2	3.2
92	ODERBRUCKER	5	---	7	1	1	2	3	3.2
2	TLLQ CMB74A-432-25B-1Y-1B-1Y-0B	9	4	5	1	1	1	2	3.3
46	(BEACON-BREA"S" X CM67/CEL)GAL-PI63B CMB79A-643-5Y-1B-2Y-1H-1Y-0B	5	0	4	1	7	2	4	3.3
90	SUDAN	5	---	7	1	1	2	4	3.3
109	EGYPT4	5	0	8	2	3	2	---	3.3
80	CEL-XV2240/CHOYA-GALT X 11012.2 CMB80-341-6Y-2B-1Y-3H-1Y-0B	9	---	6	1	1	2	2	3.5
68	GLDA"S"-EMIR CMB81A-1111-7B-1Y-0H	9	0	6	1	1	3	5	3.6
31	BREA"S"-F3 BULK HIP CMB80-53-9Y-1B-1Y-3H-1Y-0B	9	8	2	1	1	4	1	3.7
81	AB	9	---	6	1	1	2	3	3.7
42	BOY(2)-SURB(3) X SD729-POR CMB80-100-1Y-2B-1Y-2H-1Y-0B	9	6	4	---	0	2	2	3.8
11	ROBUR-BREA"S" X F3 BULK HIP CMB880A-869-D-3B-2Y-4H-0Y	9	8	4	1	1	3	1	3.9
97	AIM	4	6	8	2	1	3	3	3.9
6	CON"S"-COLLO"S" CMB80A-56-4B-1Y-1H-0Y	9	6	6	1	1	2	3	4.0
12	ROBUR-BREA"S" X F3 BULK HIP CMB880A-869-D-3B-2Y-5H-0Y	9	8	4	1	1	3	2	4.0
41	BREA"S"-F3 BULK HIP CMB80-53-9Y-1B-1Y-4H-1Y-0B	9	6	3	---	1	2	3	4.0
43	BOY(2)-SURB(3) X SD729-POR CMB80-100-1Y-2B-1Y-3H-1Y-0B	9	6	4	---	1	2	2	4.0
54	11012.2-MZG X CEL/BREA"S"-SUTTER X F3 BULK HIP CMB81-153-4Y-1H-1Y-0H	9	6	4	1	1	3	4	4.0

Table 7. Resistance to powdery mildew

LOCATIONS	CONTINENT	COUNTRY	AREA	VARIABLES INCLUDED
17	ASIA	REP. OF KOREA	SUMON GYEDONGGI PROV.	61
23	EUROPE	CZECHOSLOVAKIA	CZECHIA	61
24	EUROPE	ENGLAND	NORFOLK	61
25	EUROPE	GERMAN DEM. REP.	MAGDEBURG-HADMERSLEBEN	61
26	EUROPE	GREECE	THESSALONIKI	61
27	EUROPE	HUNGARY	HARTONVASAR	61
28	EUROPE	ITALY	MARCHE	61
29	EUROPE	NORWAY		61
32	MIDDLE EAST	CYPRUS	LAXIA	61
35	MIDDLE EAST	TURKEY	SAKARYA	61

*VARIABLE IDENTIFICATIONS
61 POW M 0-9

Powdery Mildew

Ten locations reported data from three different regions of the world. Europe with seven countries confirm the importance of the disease on this continent. Two countries in the Middle East and one from Asia reported data included in the analysis.

Turkey reported high scores in most lines presented in Table 3 that reflect a severe incidence of the disease. Some of these lines showed good levels of resistance across locations, but no immunity is present.

Table 7. (continued)

VITY NO.	VARIETY OR CROSS AND PEDIGREE	LOCATIONS										MEAN
		17	23	24	25	26	27	28	29	32	35	
85	MAGNUM	1	3	2	1	3	---	0	0	1	6	1.9
71	GLDA"S"-EMIR CMB81A-1111-6B-1Y-OM	1	2	3	1	5	---	4	0	2	6	2.7
73	GLDA"S"-EMIR CMB81A-1111-7B-4Y-OM	3	3	4	1	5	2	4	0	1	5	2.8
68	GLDA"S"-EMIR CMB81A-1111-7B-1Y-OM	3	4	4	2	5	3	4	0	1	6	3.2
72	GLDA"S"-EMIR CMB81A-1111-7B-3Y-OM	3	4	4	1	5	---	5	0	2	6	3.3
57	[(APH-DWARF21 X POR-1B65/BAL16)NOPAL S"]GLTE"S" CMB81-922-3B-2Y-OM	3	4	4	1	6	---	4	0	3	6	3.4
45	EN-48N. 73B/AGER X API-CH67 CMB79A-1568-B-6Y-1B-2Y-1H-2Y-OB	3	4	3	1	6	5	4	0	3	7	3.6
84	ARMELLE	3	4	5	1	5	---	2	3	1	8	3.6
87	NN	3	1	2	1	5	3	5	5	3	8	3.6
96	RICARDO	5	4	1	1	5	4	5	3	2	6	3.6
100	MAGNIF102	7	6	1	1	4	5	3	2	1	6	3.6
5	GLDA"S" CMB79-376-1Y-3B-2Y-1B-2Y-OB	3	6	5	2	5	6	3	2	1	6	3.9
56	CIH"S"-GLTE"S" CMB81-123-11B-2Y-OM	1	5	4	2	7	---	4	4	2	6	3.9
106	ABN	5	1	3	---	4	---	5	---	3	7	4.0
99	LECHTALER	1	5	6	2	4	5	4	5	3	6	4.1
59	CIH"S"-GLTE"S" CMB81-123-11B-3Y-OM	1	8	7	1	5	5	3	3	2	8	4.3
79	GLORIA"S"-COPAL"S" CMB81-295-18B-6Y-OM	3	5	6	2	8	---	6	3	3	3	4.3
16	NOPAL"S"-CON"S" CMB80-81-11Y-2B-1Y-3H-0Y	3	7	7	1	6	6	3	1	2	8	4.4
47	COBSACK X ESPERANCE-1808 CMSWB80A-346-3B-1Y-1B-1Y-OB	1	6	6	2	4	7	4	4	2	8	4.4
37	NOPAL"S"/API-CH67 X AGER CMB80-82-10Y-1B-1Y-1H-1Y-OB	5	6	4	1	5	---	6	1	5	8	4.6
69	COBSACK-CARLSBERG II X BREA"S"-RM150 CMSWB81A-716-A-2B-3Y-OM	3	6	5	1	5	6	6	4	3	7	4.6

Table 8. Resistance to scald

LOCATIONS	CONTINENT	COUNTRY	AREA	VARIABLES INCLUDED
2	AFRICA	MALAWI	CENTRAL PROV. (DEDZA DIST)	69
3	AFRICA	SOUTH AFRICA	CAPE PROVINCE	69
7	AFRICA	TANZANIA	MBEYA-U. A. C.	69
24	EUROPE	ENGLAND	NORFOLK	69
32	MIDDLE EAST	CYPRUS	LAXIA	69
37	NORTH AMERICA	MEXICO	EL BATAN	69
39	NORTH AMERICA	MEXICO	TOLUCA	69
40	NORTH AMERICA	U. S. A.	MONTANA	69

*VARIABLE IDENTIFICATIONS
69 BCLD 0-9

Scald

Information on scald was reported from four continents—three locations in different countries of Africa, one from Europe, one from Middle East, and three locations from two countries from America. Nine genotypes with resistant genes for scald were included in the nursery to survey virulence of *Rhynchosporium secalis* in barley producing areas; four of these lines were among the top of lines with low scores across locations. The variety Armelle (Rh) had the lowest average in all locations. The variety Kitchin (Rh9) had scores lower than 4 across locations. The variety Atlas

(Rh2) had lower scores, less than 3, except for the location in the Middle East that scores an intermediate 5. The variety Osiris (Rh4-Rh10) scored less than 5.

As a result of a continuous effort to develop barley germplasm resistant to scald, through selection of resistant germplasm or artificially inoculated nurseries with *R. secalis*, a large number of lines has emerged with good levels of scald resistance across locations.

Table 8. (continued)

VTY NO.	VARIETY OR CROSS AND PEDIGREE	LOCATIONS								MEAN
		2	3	7	24	32	37	39	40	
84	ARMELLE	---	1	0	1	0	0	3	1	0.9
15	NOPAL"S"-CON"S" CMB80-81-11Y-2B-1Y-2H-0Y	3	1	1	1	1	0	3	1	1.4
71	GLDA"S"-EMIR CMB81A-1111-6B-1Y-0M	1	1	1	1	3	0	3	1	1.4
72	GLDA"S"-EMIR CMB81A-1111-7B-3Y-0M	1	1	1	1	3	0	3	1	1.4
16	NOPAL"S"-CON"S" CMB80-81-11Y-2B-1Y-3H-0Y	4	1	1	1	1	0	3	1	1.5
88	KC C11296	1	1	4	1	4	0	0	1	1.5
64	CACO"S"/API-CH67 X 1594 CMB81-16B-6Y-3Y-0M	3	1	1	2	5	0	0	1	1.6
66	JOBO"S"/MZO X MAGMI-BON CMB81-12B9-1Y-2Y-0M	2	1	1	2	1	5	0	1	1.6
67	JOBO"S"/MZO X MAGMI-BON CMB81-12B9-1Y-4Y-0M	2	1	1	2	1	5	0	1	1.6
73	GLDA"S"-EMIR CMB81A-1111-7B-4Y-0M	1	1	1	2	4	0	3	1	1.6
75	F3 BULK HIP-H272 CMB80-409-14B-1Y-3H-5Y-0M	3	1	1	1	3	0	3	1	1.6
102	BOLIVIA	1	1	0	2	4	0	3	---	1.6
59	CIH"S"-GLTE"S" CMB81-123-11B-3Y-0M	1	1	1	2	3	---	3	1	1.7
51	GLORIA"S"-CELO"S" CMB81A-614-8B-1Y-0M	4	1	---	1	1	5	0	1	1.9
70	[GADA"S" (MAGNIF102-ABN11/PYO-CAM X AVT-RH150B)]MARI-COND/FRISKA-4839 X 7004 CMB81A-2254-B-3B-4Y-0M	1	1	1	2	4	---	3	1	1.9
79	GLORIA"S"-COPAL"S" CMB81-295-18B-6Y-0M	1	1	4	2	3	0	3	1	1.9
81	AS	1	1	0	1	3	5	3	1	1.9
19	NOPAL"S"-CON"S" CMB80-81-11Y-2B-1Y-1H-1Y-0B	4	1	1	1	5	0	3	1	2.0
58	CIH"S"-GLTE"S" CMB81-123-11B-2Y-0M	1	1	3	1	1	5	3	1	2.0
62	[[12201-ATHS(SD729-POR X 72AB58/PYO)] CH67-CENTENO X CAM CMB81A-2773-A-1B-4Y-0M	---	1	1	2	1	5	3	1	2.0
63	[[12201-ATHS(SD729-POR X 72AB58/PYO)] CH67-CENTENO X CAM CMB81A-2773-A-1B-7Y-0M	3	1	1	1	1	5	3	1	2.0
69	COSSACK-CARLSBERG II X BREA"S"-RH150 CMB81A-716-A-2B-3Y-0M	1	1	1	2	1	5	4	1	2.0
83	OSR	5	1	0	2	4	0	3	1	2.0
101	GUINN	2	1	0	3	5	0	3	---	2.0



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