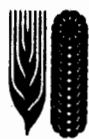




**Results of the
Second Heat Tolerance
Screening Nursery
(1984-85)**





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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	Dégât du aux fourmis en pourcentage
APHD DMGE	—	Aphid damage (percentage)	Porcentaje de daño por áfidos	Dégât du aux pucerons en pourcentage
ARMY WORM	—	Army worm damage (percentage)	Porcentaje de daño por gusano cogollero	Dégât 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	Espèces bactériennes
BAC B	<i>Pseudomonas syringae</i> pv. striafaciens	Bacterial blight (0-9 scale)	Tizón bacteriano de la hoja (escala 0-9)	Brûlure 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	Dégât 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)	Jaunisse 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	Dégât 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 niveo (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	Dégât 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)	Oidium (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>Laptosphaeria 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 septorienne 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	Varietal	Variété
VTY	—	Variety	Varietal	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)

Second Heat Tolerance Screening Nursery

Wolfgang Pfeiffer, Ravi Singh and Maximino Alcalá¹

Introduction

Heat tolerance is an essential characteristic for wheats grown in certain areas of the world. Recently, in collaboration with certain national crop improvement programs located in the warmer wheat production environments, CIMMYT began an effort to produce wheat germplasm tolerant to heat.

Heat tolerance is required in the crop's early and late growth stages. Germination, tillering, head production, and grain filling must proceed normally under high-temperature conditions. Unadapted types show inadequate tillering, death of secondary tillers, poor plant vigor, very early flowering dates, reduced fertility, grain shrivelling, and low seed weight. A program has been initiated to identify varieties and advanced lines having tolerance to high temperatures. As for many other desired characteristics, we heavily depend on multilocation testing. In Mexico, three locations are used for germplasm evolution for heat tolerance. At Cd. Obregon (27°N, 39 Masl) planting of the relevant nurseries is delayed until January so the early growth stages occur during a period of rapidly rising temperatures. In addition, Tampico (22°N, 4 Masl) and Poza Rica (21°N, 60 masl) are used during the summer cycle. The following selection criteria are used in our screening for heat tolerance:

- longer leaf retention
- high tillering capacity
- acceptable spike fertility
- 1000 grain weight
- test weight
- yield

Materials are sent for evaluation to specific locations experiencing high temperatures in Africa and Asia, and North, Central, and South America. While the primary criterion in selecting germplasm for the 2nd Heat Tolerance Screening Nursery (HTSN) was performance under high temperatures, the cooperators were requested to take additional notes on yield, agronomic traits, and reaction to diseases.

This report summarizes the data of the 2nd HTSN. The results obtained from this cooperative undertaking will be used in our program to guide future breeding efforts. We hope that the germplasm made available and the information summarized here will be of benefit to breeders world wide in their attempts to improve heat tolerance in their material.

Methodology

The 2nd HTSN was sent in September 1984 to be grown by cooperators in the 1984-1985 season. Thirty-seven nurseries went to cooperators in 23 countries. The 113 advanced lines and checks in the nursery had been chosen from among CIMMYT's best materials.

All had been grown and observed by CIMMYT 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 double 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. In receiving and processing the data returned by cooperators, CIMMYT 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.

Twenty-one of the cooperators receiving the nursery returned field books with performance data at their locations (Table 1) 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 international nursery reports: first, the prompt return of carefully recorded data from each and every trial site; second, identification of environmental

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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.

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 reading (110) net, be reported as severity/response scores.

Discussion of results

Of the 37 nurseries distributed, data were received from 21 (Table 1). The means for all yield, agronomic and disease resistance characteristics for the 113 entries are given in Table 2. In addition, the top-ranking entries for yield, days to heading days to maturity, and resistance to leaf rust are featured in Tables 3-6.

Yield—The mean yields of all entries in the 2nd HTSN are listed in Table 2; they range from 2073.5 kg/ha for entry 72, CKR''S'' x YR-TRF''S'', to 3759.8 for entry 13, ALDAN''S''-IAS58.

Table 3 lists the entries that produced the highest yields on the basis of 13 locations. The mean yield for these entries varied from 3002.2 kg/ha, for R37-GHL121 x KAL-BB/KLT''S'', to 3759.8 kg/ha, for ALDAN''S''-IAS58. More than 40% of the entries yielded higher than 3 t/ha. It should be recognized that yield evaluations based on unreplicated trials can be misleading, but in this case some degree of validity can be claimed because of the high number of locations represented.

Based on these data, it appears warranted to further investigate the breadth of adaptability of the entries in Table 3 by distributing them in a replicated trial.

Heading data—Table 4 lists the 41 entries with the earliest heading dates at 15 locations. The mean dates of heading range from 75.1 days after planting for HD669.1B-VRE''S'' to 80.9 days after planting for R37-GHL121 x KAL-BB/KLT''S''. The latest heading entries in the 2nd HTSN have values of more than 90 days. More than one third of the entries distributed headed on average within 81 days.

Maturity date—Table 5 presents the 29 earliest maturing entries at 13 locations. Mean maturity dates vary from 119.8 for HD 669.1B-VRE''S'' to 124.0 for LIRA''S'' and PAM''S''-BUC''S''. Some entries in the 2nd HTSN required more than 130 days to mature. About 25% of the entries matured within 124 days.

Leaf Rust Resistance—Leaf rust data (Table 6) were obtained from five locations. The range for leaf rust infection (ACI) in the 2nd HTSN varied from 0.0 for entry 74, R37-GHL121 x KAL-BB/KLT''S'' to 33.0 for entry 113, NS713-PCI''S'' x VEE No. 5. Thirty entries (about 25% of the total) had average coefficients of infection of 2.0 or less.

Table 1. Locations returning reports and the variables included.

LOCATIONS	CONTINENT	COUNTRY	AREA	VARIABLES INCLUDED										
1	AFRICA	EGYPT	KENA	1 3 4 9 50										
2	AFRICA	EGYPT	SOHAQ	3 4 9 50										
3	AFRICA	ZIMBABWE	CHIREDDI	1 3 4 9										
4	ASIA	BANGLADESH	JESSORE	1 3 4 9 50 68										
5	ASIA	BURMA	YE-U (SAGAIN DIV.)	1 3 4 7 9 13 50										
6	ASIA	CHINA	BEIJING	1 9										
7	ASIA	CHINA	NANJING-JIANOSU	3 4 13 50										
8	ASIA	NEPAL	RUPANDEMI	3 4 9 72										
9	ASIA	PAKISTAN	PUNJAB-BAHAWALPUR	1 3 4 9 50										
10	ASIA	PAKISTAN	PUNJAB-NIAB	3 4 9 10 50										
11	ASIA	PAKISTAN	BIND	1 3 4 9										
12	ASIA	THAILAND	NAKHON RATCHBINA	1 9 50										
13	CENTRAL AMERICA	COSTA RICA	ALAJUELA-FABIO BAUDRIT	1 3 4 9 50										
14	NORTH AMERICA	MEXICO	EBANO S. L. P.	1 3 4 7 9 50										
15	NORTH AMERICA	MEXICO	EL BATAN	3 4 7 9										
16	NORTH AMERICA	U. S. A.	CALIFORNIA-DAVIS	77										
17	SOUTH AMERICA	ARGENTINA	CORDOBA	50										
18	SOUTH AMERICA	BOLIVIA	SANTA CRUZ-CIAT	3 7 50										
19	SOUTH AMERICA	BRAZIL	PARANA-LONDRINA	1 3 7 8 9 50 68										
20	SOUTH AMERICA	BRAZIL	PARANA-PALOTINA	1 50										
21	SOUTH AMERICA	BRAZIL	SAO PAULO-CAMPINAS	1 9 50 61										
*VARIABLE IDENTIFICATIONS														
1	YIELD	KG/HA	3	HEAD	DAYS	4	MAT	DAYS	7	LEAF	RUST	8	STEM	RUST
9	PLNT	HT	10	LDDG	X	13	1000	G. W.	50	CHECK	MARK	61	POW M	0-9
68	SPT B	0-9	72	TAN S	0-9	77	BYDV	0-9						

Table 2. Means of all variables across all locations for each line.

VTY NO.	VARIETY OR CROSS AND PEDIGREE	GRAIN	ORIGIN	YIELD KG/HA	HEAD DAYS	MAT DAYS	LEAF RUST	STEM RUST	PLANT HT	LODG %
		NUMBER OF OBSERVATIONS		(13)	(15)	(13)	(5)	(1)	(16)	(1)
1	ME1"S" SMH4585-30M-1Y-4M-1Y-1M-1Y-0B			3510.6	86.3	129.5	2.4	4.0	85.0	0.0
2	F3 71-TRM SMH5704-10Y-1M-3Y-1M-1Y-0B			3325.8	84.8	131.8	10.3	2.0	78.1	0.0
3	F3 71-TRM SMH5704-10Y-1M-3Y-3M-2Y-3M-0Y			3111.0	87.0	131.8	9.0	4.0	78.1	0.0
4	TAN"S" CM30697-2M-8Y-7M-0Y			3242.4	81.5	125.8	13.3	8.0	86.9	0.0
5	VEE"S" CM33027-F-12M-1Y-1M-1Y-1M-0Y-60B-0Y-1PTZ-0Y			3150.5	90.6	131.6	12.3	16.0	79.9	80.0
6	VEE#9 CM33027-F-12M-1Y-12M-1Y-2M-0Y			3522.5	90.5	131.8	9.0	16.0	81.9	0.0
7	VEE"S" CM33027-F-15M-4Y-4M-3Y-2M-1Y-0M			3618.3	86.8	129.4	15.8	2.0	91.1	0.0
8	VEE"S" CM33027-F-15M-500Y-0M-66B-0Y			3255.2	85.7	127.3	10.8	2.0	85.8	0.0
9	VEE"S" CM33027-F-15M-500Y-0M-98B-0Y			3674.8	84.7	126.6	10.0	2.0	84.1	0.0
10	VEE"S" CM33027-F-15M-500Y-0M-115B-0Y			3594.0	85.3	126.3	9.8	4.0	81.5	0.0
11	VEE#6 CM33027-I-2M-1Y-1M-1Y-3M-0Y			2624.2	78.0	122.0	3.0	0.0	77.8	80.0
12	LIRA"S" CM43903-H-4Y-1M-2Y-1M-1Y-0B			2339.2	80.5	124.0	3.8	2.0	73.0	0.0
13	ALDAN"S"-IAS58 CM53481-6Y-1Y-4M-1Y-1M-1Y-0M			3759.8	87.7	129.5	1.8	4.0	87.1	0.0
14	BUC"S"-BJY"S" CM49641-9Y-1M-4Y-0Y			3003.9	79.7	125.8	4.3	4.0	80.2	0.0
15	BUC"S"-BJY"S" CM49641-9Y-1M-1Y-5Y-0M			3638.0	78.4	125.8	7.3	5.0	81.2	0.0
16	CC-T0B(2) X HN72131 CM50308-5Y-3M-1Y-1Y-1M-0Y			2555.9	77.3	121.5	7.8	8.0	86.8	70.0
17	CC-T0B(2) X HN72131 CM50308-5Y-3M-3Y-1Y-2M-0Y			2337.4	76.9	121.6	2.0	4.0	87.4	50.0
18	CC-T0B(2) X HN72131 CM50308-5Y-3M-3Y-2Y-1M-0Y			2819.5	76.9	122.1	3.4	4.0	88.6	0.0
19	BUC"S"-BUL"S" CM50609-3Y-1M-3Y-0Y			3174.6	80.3	124.9	0.0	20.0	87.7	0.0
20	GENAROB1			3402.3	90.2	130.5	25.0	8.0	81.9	0.0
21	BUC"S"-PVN"S" CM52359-12M-1Y-2Y-3M-1Y-3M-0Y			3436.2	87.5	131.2	14.0	12.0	81.7	0.0
22	BUC"S"(TZPP X IRN46-CND67/PRT) CM56744-7Y-2Y-1M-1Y-0M			3465.1	81.7	128.5	0.0	48.0	84.9	0.0
23	ALD"S"-SAP"S"(L. S. 3. 1-PI X MAYA"S"(2 /TRM) CM57928-A-2Y-1Y-1M-1Y-1M-4Y-0M			3532.3	90.4	132.2	7.5	16.0	81.7	0.0
24	ALD"S"-DOVE"S" X ALDAN"S"-PF70354 CM58273-D-2Y-5Y-3M-1Y-1M-1Y-0M			3007.4	76.5	120.8	0.8	1.0	82.8	0.0
25	SPT"S" CM58478-B-2Y-1Y-2M-2Y-0M			3343.7	86.5	128.9	12.3	2.0	84.5	0.0
26	JUP-7P X CDC/PVN CM58705-3M-1Y-1M-1Y-2M-1Y-0M			2891.5	89.7	131.4	5.8	4.0	80.3	0.0
27	T0B(2)-7C X BUC"S" CM58796-5M-1Y-1M-3Y-1M-0Y			2853.4	83.6	127.1	16.3	24.0	82.3	0.0

Table 2. Continued

VTY NO.	VARIETY OR CROSS AND PEDIGREE	GRAIN	ORIGIN	NUMBER OF OBSERVATIONS:					
				1000 G. W.	CHECK MARK	POW H 0-9	SPT B 0-9	TAN S 0-9	BYDV 0-9
				(2)	(15)	(1)	(2)	(1)	(1)
1	HEI"S" SM4585-30M-1Y-4M-1Y-1M-1Y-08			33.0	20.0	6.0	5.5	8.0	6.0
2	F3. 71-TRM SM5704-10Y-1M-3Y-1M-1Y-08			34.5	33.3	8.0	5.5	8.0	7.0
3	F3. 71-TRM SM5704-10Y-1M-3Y-3M-2Y-3M-0Y			31.0	26.7	6.0	5.5	8.0	6.0
4	TAN"S" CH30677-2M-8Y-7M-0Y			36.0	13.3	3.0	6.0	8.0	8.0
5	VEE"S" CH33027-F-12M-1Y-1M-1Y-1M-0Y- 608-0Y-1PTZ-0Y			30.0	20.0	8.0	4.0	8.0	7.0
6	VEE#9 CH33027-F-12M-1Y-12M-1Y-2M-0Y			33.0	20.0	8.0	6.0	8.0	8.0
7	VEE"S" CH33027-F-15M-4Y-4M-3Y-2M-1Y-0M			36.0	33.3	8.0	4.0	8.0	6.0
8	VEE"S" CH33027-F-15M-300Y-0M-668-0Y			35.0	26.7	8.0	3.0	8.0	7.0
9	VEE"S" CH33027-F-15M-300Y-0M-988-0Y			33.0	20.0	6.0	4.0	8.0	7.0
10	VEE"S" CH33027-F-15M-300Y-0M-1158-0Y			35.5	26.7	7.0	4.5	8.0	7.0
11	VEE#6 CH33027-I-2M-1Y-1M-1Y-3M-0Y			43.0	46.7	5.0	6.0	8.0	7.0
12	LIRA"S" CM43903-H-4Y-1M-2Y-1M-1Y-08			35.0	26.7	8.0	4.5	8.0	7.0
13	ALDAN"S"-IAS98 CM53481-6Y-1Y-4M-1Y-1M-1Y-0M			36.5	40.0	6.0	6.0	8.0	6.0
14	BUC"S"-BJY"S" CM49641-9Y-1M-4Y-0Y			42.5	26.7	6.0	6.0	8.0	5.0
15	BUC"S"-BJY"S" CM49641-9Y-1M-1Y-5Y-0M			41.5	20.0	8.0	6.5	8.0	6.0
16	CC-TOB (2) X HW72131 CM50308-5Y-3M-1Y-1Y-1M-0Y			41.5	20.0	6.0	7.0	8.0	6.0
17	CC-TOB (2) X HW72131 CM50308-5Y-3M-3Y-1Y-2M-0Y			43.0	20.0	3.0	7.0	8.0	6.0
18	CC-TOB (2) X HW72131 CM50308-5Y-3M-3Y-1Y-2M-0Y			44.0	33.3	6.0	4.0	8.0	6.0
19	BUC"S"-SUL"S" CM50609-3Y-1M-3Y-0Y			41.0	40.0	3.0	7.0	8.0	6.0
20	GEMARD81			30.5	26.7	6.0	6.0	8.0	8.0
21	BUC"S"-PVN"S" CM52359-12M-1Y-2Y-3M-1Y-3M-0Y			40.0	26.7	6.0	5.5	8.0	6.0
22	BUC"S" (TZPP X IRM46-CM067/PRT) CM56744-7Y-2Y-1M-1Y-0M			42.0	20.0	8.0	6.5	8.0	5.0
23	ALD"S"-SAP"S" (L. S. 3. 1-PI X MAYA"S" (2 /TRM) CM57828-A-2Y-1Y-1M-1Y-1M-4Y-0M			34.0	13.3	9.0	5.0	8.0	5.0
24	ALD"S"-DOVE"S" X ALDAN"S"-PF70354 CM58273-D-2Y-5Y-3M-1Y-1M-1Y-0M			38.0	33.3	6.0	6.0	8.0	6.0
25	SPT"S" CM58478-B-2Y-1Y-2M-2Y-0M			37.0	20.0	8.0	5.0	8.0	7.0
26	JUP-ZP X CDC/PVN CM58703-3M-1Y-1M-1Y-2M-1Y-0M			37.0	26.7	6.0	6.0	8.0	8.0
27	TOB (2)-7C X BUC"S" CM58796-5M-1Y-1M-3Y-1M-0Y			36.0	13.3	8.0	6.0	8.0	7.0

Table 2. Continued

VTY NO.	VARIETY OR CROSS AND PEDIGREE	GRAIN	ORIGIN	YIELD KG/HA	HEAD DAYS	MAT DAYS	LEAF RUST	STEM RUST	PLNT HT	LODG %	NUMBER OF OBSERVATIONS:									
											(13)	(15)	(13)	(5)	(1)	(16)	(1)			
28	PAH"S"-BUC"S" CM58797-4Y-1M-1Y-1M-4Y-0M			2471.1	76.7	123.1	1.8	8.0	74.9	0.0										
29	PAH"S"-BUC"S" CM58797-4Y-1M-1Y-2M-1Y-0M			2932.1	80.7	125.2	12.3	5.0	79.5	0.0										
30	PAH"S"-BUC"S" CM58797-4Y-1M-1Y-2M-2Y-2M-0Y			3441.9	81.3	124.0	11.8	5.0	79.4	0.0										
31	DOVE"S"-BUC"S" CM58808-27Y-2M-6Y-2M-2Y-0M			2644.0	79.1	123.6	3.7	1.0	74.8	0.0										
32	DOVE"S"-BUC"S" CM58808-27Y-2M-10Y-1M-0Y			2713.7	78.7	122.6	5.3	5.0	73.9	0.0										
33	SIS"S"-VEE"S" CM58831-3M-2Y-2M-2Y-1M-1Y-0M			2755.9	92.7	131.5	1.0	8.0	84.1	0.0										
34	DOVE"S"-TS1 CM58952-6Y-4M-1Y-1M-4Y-0M			2648.9	78.3	122.8	23.6	0.0	82.7	0.0										
35	TTR"S"-TTM"B" CM58956-1Y-1M-2Y-1M-2Y-0M			2300.2	77.9	123.0	2.3	20.0	79.8	0.0										
36	KEA"S"-TOM"S" CM58975-2Y-3M-1Y-7M-2Y-0M			3004.7	81.9	125.7	7.5	2.0	80.6	0.0										
37	TTR"S"-JUN"S" CM59123-3M-1Y-1M-2Y-1M-0Y			2679.5	89.5	130.2	2.5	2.0	82.8	0.0										
38	TTR"S"-JUN"S" CM59123-3M-1Y-1M-4Y-1M-1Y-0M			3130.5	89.6	130.8	2.0	4.0	81.8	0.0										
39	TTR"S"-JUN"S" CM59123-4M-1Y-1M-1Y-0M			3581.8	90.3	131.5	2.0	4.0	85.6	0.0										
40	GENARDB1			3091.7	89.9	131.0	19.4	4.0	80.9	0.0										
41	TTR"S"-JUN"S" CM59123-4M-1Y-2M-3Y-3M-1Y-0M			3173.2	92.3	133.6	1.5	8.0	84.1	0.0										
42	F6 74-BUN"S" X SIS"S" CM60042-M-1Y-2M-2Y-1M-2Y-0M			3027.5	92.0	134.0	1.0	4.0	87.4	0.0										
43	PJ-CAL X EMU"S"/KA"S"-BCH"S" CM60443-A-2Y-1M-2Y-2M-3Y-1M-0Y			3176.0	90.3	131.1	2.0	2.0	90.9	0.0										
44	(COG"S"-F41.70 X CNDR"S"/DLN)PHO"S" CM60907-B-1Y-6M-6Y-1M-2Y-1M-0Y			2982.1	82.5	125.5	5.5	0.0	88.4	0.0										
45	L2266-1406.101 X BUC"S"/VPM-MOS 83.1 4. B X NAC CM61550-C-1Y-1M-1Y-1M-1Y-2M-0Y			2778.1	79.1	123.5	1.3	1.0	93.4	16.0										
46	L2266-1406.101 X BUC"S"/VPM-MOS 83.1 4. B X NAC CM61550-C-1Y-1M-1Y-1M-1Y-3M-0Y			2832.8	79.0	123.5	4.5	1.0	94.6	25.0										
47	H546.71(2)-H567.71 X AUFN(EMU"S"/ TOB-ERA X TOB-CNO67) CM61636-A-5Y-1M-1Y-1M-2Y-3M-0Y			2845.9	78.5	123.3	6.0	2.0	92.7	40.0										
48	H546.71(2)-H567.71 X AUFN(EMU"S"/ TOB-ERA X TOB-CNO67) CM61636-A-5Y-1M-1Y-1M-3Y-2M-0Y			2270.8	78.7	123.4	3.2	2.0	90.4	25.0										
49	BOW"S"-NAC CM61755-10Y-3M-1Y-3M-1Y-1M-3Y-0M			2456.1	96.1	136.0	8.5	20.0	88.1	40.0										
50	MON"S"-IMU CM61942-5Y-1M-1Y-1M-0Y			3471.8	84.1	128.2	0.8	16.0	87.0	0.0										
51	MRL"S"-BUC"S" CM61949-3M-4Y-1M-1Y-1M-0Y			2722.4	80.1	125.9	6.8	2.0	78.4	0.0										
52	MRL"S"-BUC"S" CM61949-3M-4Y-1M-3Y-1M-0Y			2542.8	79.4	125.2	5.0	4.0	78.8	0.0										
53	MRL"S"-BUC"S" CM61949-3M-4Y-1M-5Y-0M			2628.6	78.1	124.2	5.0	2.0	79.1	0.0										
54	MRL"S"-BUC"S" CM61949-13Y-1M-2Y-1M-1Y-0M			2814.7	79.9	123.3	4.5	8.0	84.8	40.0										
55	MRL"S"-BUC"S" CM61949-13Y-1M-2Y-1M-1Y-1M-0Y			2785.1	79.9	123.5	5.0	16.0	84.7	50.0										

Table 2. Continued

VTY NO.	VARIETY OR CROSS AND PEDIGREE	GRAIN	ORIGIN	NUMBER OF OBSERVATIONS:					
				1000 O. W.	CHECK MARK	POW M 0-9	SPT B 0-9	TAN S 0-9	BYDV 0-9
28	PAR"S"-BUC"S" CM68797-4Y-1H-1Y-1H-4Y-0H			(2)	(15)	(1)	(2)	(1)	(1)
29	PAR"S"-BUC"S" CM68797-4Y-1H-1Y-2H-1Y-0H			39.0	26.7	6.0	7.0	8.0	7.0
30	PAR"S"-BUC"S" CM68797-4Y-1H-1Y-2H-2Y-2H-0Y			38.5	26.7	6.0	6.0	8.0	-----
31	DOVE"S"-BUC"S" CM68808-27Y-2H-6Y-2H-2Y-0H			40.5	26.7	6.0	6.5	8.0	6.0
32	DOVE"S"-BUC"S" CM68808-27Y-2H-10Y-1H-0Y			40.0	6.7	8.0	7.5	8.0	6.0
33	SIS"S"-VEE"S" CM68831-3H-2Y-2H-2Y-1H-1Y-0H			36.0	6.7	6.0	7.0	8.0	5.0
34	DOVE"S"-TSI CM68932-6Y-4H-1Y-1H-4Y-0H			35.0	26.7	6.0	4.5	8.0	6.0
35	TTR"S"-TTH"S" CM68956-1Y-1H-2Y-1H-2Y-0H			37.0	26.7	5.0	7.0	8.0	6.0
36	NEA"S"-TON"S" CM68975-2Y-3H-1Y-7H-2Y-0H			35.0	0.0	8.0	6.0	8.0	6.0
37	TTR"S"-JUN"S" CM69123-3H-1Y-1H-2Y-1H-0Y			35.0	40.0	6.0	5.5	8.0	6.0
38	TTR"S"-JUN"S" CM69123-3H-1Y-1H-4Y-1H-1Y-0H			36.5	26.7	6.0	5.0	8.0	5.0
39	TTR"S"-JUN"S" CM69123-4H-1Y-1H-1Y-0H			33.0	26.7	6.0	4.0	8.0	6.0
40	SENARDB1			32.5	46.7	6.0	4.5	8.0	6.0
41	TTR"S"-JUN"S" CM69123-6H-1Y-2H-3Y-3H-1Y-0H			35.0	13.3	3.0	4.5	8.0	7.0
42	F6.74-BUN"S" X SIS"S" CM60042-H-1Y-2H-2Y-1H-2Y-0H			36.5	33.3	6.0	5.0	8.0	7.0
43	PJ-CAL X ERU"S"/KA"S"-SCH"S" CM60443-A-2Y-1H-2Y-2H-3Y-1H-0Y			38.0	13.3	3.0	4.5	8.0	6.0
44	(COB"S"-F41.70 X CDR"S"/OLM)PHO"S" CM60907-B-1Y-6H-6Y-1H-2Y-1H-0Y			35.0	33.3	3.0	6.0	8.0	7.0
45	L2264-1406.101 X BUC"S"/VPH-NOS 83.1 .4.8 X NAC CM61350-C-1Y-1H-1Y-1H-1Y-2H-0Y			36.5	20.0	6.0	3.5	8.0	6.0
46	L2264-1406.101 X BUC"S"/VPH-NOS 83.1 .4.8 X NAC CM61350-C-1Y-1H-1Y-1H-1Y-2H-0Y			37.0	13.3	8.0	5.0	8.0	6.0
47	HS46.71(2)-HS67.71 X AUFN(ERU"S"/ TOS-ERA X TOS-CND67) CM61636-A-3Y-1H-1Y-1H-2Y-3H-0Y			38.0	40.0	6.0	5.0	8.0	5.0
48	HS46.71(2)-HS67.71 X AUFN(ERU"S"/ TOS-ERA X TOS-CND67) CM61636-A-3Y-1H-1Y-1H-3Y-2H-0Y			42.0	33.3	3.0	6.0	8.0	4.0
49	BOW"S"-NAC CM61755-10Y-3H-1Y-3H-1Y-1H-3Y-0H			38.5	26.7	6.0	7.0	8.0	3.0
50	NON"S"-IMU CM61942-3Y-1H-1Y-1H-0Y			39.0	6.7	6.0	5.0	8.0	6.0
51	NRL"S"-BUC"S" CM61949-3H-4Y-1H-1Y-1H-0Y			38.5	46.7	8.0	6.5	8.0	6.0
52	NRL"S"-BUC"S" CM61949-3H-4Y-1H-3Y-1H-0Y			38.0	20.0	3.0	6.0	8.0	5.0
53	NRL"S"-BUC"S" CM61949-3H-4Y-1H-5Y-0H			42.0	33.3	6.0	6.0	8.0	5.0
54	NRL"S"-BUC"S" CM61949-13Y-1H-2Y-1H-1Y-0H			39.0	33.3	6.0	7.0	8.0	6.0
55	NRL"S"-BUC"S" CM61949-13Y-1H-2Y-1H-1Y-1H-0Y			37.5	33.3	3.0	6.5	8.0	6.0
				36.0	53.3	3.0	6.5	8.0	6.0

Table 2. Continued

VTY NO.	VARIETY OR CROSS AND PEDIGREE	GRAIN	ORIGIN	YIELD KG/HA	HEAD DAYS	MAT DAYS	LEAF RUST	STEM RUST	PLNT HT	LODQ %
NUMBER OF OBSERVATIONS:				(13)	(15)	(13)	(5)	(1)	(16)	(1)
56	VEE"S"-BUC"S" CM61950-9Y-3M-1Y-1M-5Y-OM			3142.5	79.5	123.6	2.3	16.0	84.4	0.0
57	MON"S" X SIS"S"-CAN"S" CM62142-5Y-2M-1Y-1M-2Y-OM			2647.3	80.4	123.4	1.0	8.0	84.3	0.0
58	MON"S" X SIS"S"-CAN"S" CM62142-5Y-2M-1Y-1M-3Y-OM			2816.4	79.7	122.9	1.8	4.0	84.9	0.0
59	MON"S" X SIS"S"-CAN"S" CM62142-5Y-2M-1Y-2M-1Y-OM			3078.3	79.7	123.8	5.6	4.0	83.4	0.0
60	GENAROB1			2979.9	88.1	130.7	23.8	8.0	78.9	0.0
61	MON"S" X SIS"S"-CAN"S" CM62142-5Y-2M-1Y-1M-5Y-OM			3039.0	79.4	122.6	1.0	24.0	80.7	0.0
62	MON"S" X SIS"S"-CAN"S" CM62142-5Y-3M-1Y-1M-3Y-OM			3075.4	81.9	123.8	2.5	16.0	83.9	0.0
63	MON"S" X SIS"S"-CAN"S" CM62142-5Y-3M-1Y-2M-1Y-OM			2826.1	83.6	125.1	0.7	8.0	84.5	0.0
64	MON"S" X SIS"S"-CAN"S" CM62142-5Y-3M-1Y-2M-6Y-OM			2879.9	83.3	124.8	2.0	16.0	84.7	10.0
65	PRL"S"-ALD"S" CM62304-64LB-1B-1Y-1M-2Y-OM			2967.8	79.9	124.4	2.5	8.0	80.2	0.0
66	HD669.1B-VRE"S" CM62538-1Y-2M-2Y-1M-1Y-OM			2672.5	75.1	119.8	1.5	5.0	92.0	10.0
67	HI669(TOR"S"-HDB32(2) X TOB/TOR"S"-HDB32(2)) CM62550-1Y-1M-2Y-1M-1Y-OM			2471.2	75.6	119.9	8.2	5.0	91.4	25.0
68	NAC-VEE"S" CM64224-5Y-1M-1Y-OM			2730.7	80.3	123.6	15.5	16.0	86.1	0.0
69	SPRW"S"-PVN"S" X VEE"S" CM64491-6Y-1M-5Y-OM			2715.4	86.0	127.3	9.5	0.0	82.6	0.0
70	MYNA"S"-VUL"S" CM64546-2M-1Y-1M-5Y-OM			2915.3	84.5	128.5	11.3	8.0	83.4	0.0
71	MYNA"S"-VUL"S" CM64546-2M-1Y-1M-5Y-1M-2Y-OM			3149.7	84.5	127.4	5.3	8.0	83.3	0.0
72	CKR"S" X YR-TRF"S" CM64555-4M-1Y-1M-3Y-OM			2073.5	81.9	124.1	18.7	24.0	86.4	0.0
73	R37-OHL121 X KAL-BB/KLT"S" CM64609-5Y-4M-4Y-OM			3159.8	81.1	125.7	2.0	10.0	74.9	0.0
74	R37-OHL121 X KAL-BB/KLT"S" CM64609-6Y-1M-2Y-OM			3002.2	80.9	125.5	0.0	10.0	77.6	0.0
75	TAN"B"-PEW"S" CM64642-5Y-2M-4Y-1M-0Y			2617.5	85.7	128.4	3.3	20.0	87.1	0.0
76	MOR"S"-MON"S" CM64736-6Y-2M-1Y-OM			2308.0	83.0	126.8	0.5	24.0	74.6	0.0
77	KAL-BB X MON"S"/CNDR"S"-ANA X CNDR"S-MUS"S" CM64767-9Y-1M-4Y-1M-0Y			2571.6	86.0	128.8	1.0	40.0	79.6	0.0
78	KAL-BB X MON"S"/CNDR"S"-ANA X CNDR"S-MUS"S" CM64767-9Y-3M-3Y-1M-0Y			2618.3	88.1	130.8	0.8	60.0	82.8	0.0
79	(MAYA"S"/GLL-AUST1161.157 X CNO67-ND)YACO"S" CM64991-2M-2Y-1M-1Y-OM			2456.4	79.5	125.2	10.0	24.0	79.8	0.0
80	GENAROB1			3188.8	89.3	131.1	20.2	16.0	79.8	0.0
81	(RRV-WH15/BJ"S"-ON(2) X BON)NAC CM65202-3M-2Y-3M-1Y-3M-1Y-OM			3425.7	79.5	124.3	23.8	27.0	87.2	0.0
82	(RRV-WH15/BJ"S"-ON(2) X BON)NAC CM65202-3M-2Y-3M-2Y-OM			3221.5	79.5	124.4	28.5	5.0	84.4	0.0
83	(RRV-WH15/BJ"S"-ON(2) X BON)NAC CM65202-3M-2Y-3M-4Y-OM			2749.3	79.4	124.3	26.5	9.0	83.6	0.0

Table 2. Continued

VTY NO.	VARIETY OR CROSS AND PEDIGREE	GRAIN	ORIGIN	NUMBER OF OBSERVATIONS:					
				1000 Q. M.	CHECK MARK	POW M 0-9	SPT B 0-9	TAN S 0-9	BYDV 0-9
				(2)	(15)	(1)	(2)	(1)	(1)
56	VEE"S"-BUC"S" CM61930-9Y-2H-1Y-1H-5Y-0H			35.0	40.0	6.0	6.5	8.0	6.0
57	NON"S" X SIS"S"-CAN"S" CM62142-5Y-2H-1Y-1H-2Y-0H			37.0	26.7	8.0	6.0	8.0	7.0
58	NON"S" X SIS"S"-CAN"S" CM62142-5Y-2H-1Y-1H-3Y-0H			41.0	26.7	3.0	5.0	8.0	7.0
59	NON"S" X SIS"S"-CAN"S" CM62142-5Y-2H-1Y-2H-1Y-0H			41.0	20.0	6.0	5.0	8.0	8.0
60	GENAROB1			38.0	0.0	3.0	6.0	8.0	6.0
61	NON"S" X SIS"S"-CAN"S" CM62142-5Y-2H-1Y-1H-5Y-0H			39.5	46.7	6.0	5.0	8.0	7.0
62	NON"S" X SIS"S"-CAN"S" CM62142-5Y-3H-1Y-1H-3Y-0H			34.5	46.7	8.0	4.5	8.0	7.0
63	NON"S" X SIS"S"-CAN"S" CM62142-5Y-3H-1Y-2H-1Y-0H			31.5	33.3	6.0	5.0	8.0	6.0
64	NON"S" X SIS"S"-CAN"S" CM62142-5Y-3H-1Y-2H-6Y-0H			33.0	26.7	6.0	5.0	8.0	6.0
65	PRL"S"-ALD"S" CM62304-64LB-1B-1Y-1H-2Y-0H			38.5	33.3	6.0	5.0	8.0	6.0
66	MD649. 1B-VRE"S" CM62538-1Y-2H-2Y-1H-1Y-0H			32.0	13.3	3.0	7.0	8.0	6.0
67	HI649(TOR"S"-HDS32(2) X TOR/TOR"S"- HDS32(2)) CM62550-1Y-1H-2Y-1H-1Y-0H			30.0	20.0	3.0	6.5	8.0	7.0
68	NAC-VEE"S" CM64224-5Y-1H-1Y-0H			40.5	46.7	6.0	6.5	8.0	6.0
69	SPRW"S"-PVN"S" X VEE"S" CM64491-6Y-1H-5Y-0H			31.0	13.3	6.0	7.0	8.0	----
70	MYNA"S"-VUL"S" CM64544-2H-1Y-1H-5Y-0H			38.0	33.3	3.0	7.0	8.0	6.0
71	MYNA"S"-VUL"S" CM64544-2H-1Y-1H-5Y-1H-2Y-0H			41.0	26.7	3.0	7.0	8.0	5.0
72	CKR"S" X VR-TRF"S" CM64555-4H-1Y-1H-3Y-0H			43.0	26.7	3.0	6.0	8.0	7.0
73	R37-QH.121 X KAL-BB/KLT"S" CM64609-5Y-4H-4Y-0H			35.0	26.7	6.0	5.5	8.0	5.0
74	R37-QH.121 X KAL-BB/KLT"S" CM64609-6Y-1H-2Y-0H			35.0	26.7	3.0	5.5	8.0	5.0
75	TAN"S"-PEM"S" CM64642-5Y-2H-4Y-1H-0Y			38.5	26.7	3.0	6.0	8.0	----
76	MOR"S"-NON"S" CM64736-6Y-2H-1Y-0H			35.0	20.0	3.0	7.0	8.0	6.0
77	KAL-BB X NON"S"/CNR"S"-ANA X CNDR"S -FUS"S" CM64767-9Y-1H-4Y-1H-0Y			37.0	20.0	6.0	6.0	8.0	6.0
78	KAL-BB X NON"S"/CNR"S"-ANA X CNDR"S -FUS"S" CM64767-9Y-3H-3Y-1H-0Y			37.0	20.0	3.0	6.5	8.0	6.0
79	(MAYA"S"/QLL-AUSTII&1. 157 X CND67- MD)VACD"S" CM64991-2H-2Y-1H-1Y-0H			34.0	6.7	3.0	5.5	8.0	6.0
80	GENAROB1			28.0	26.7	8.0	5.0	8.0	7.0
81	(RRV-WJ15/BJ"S"-ON(2) X BON)NAC CM65202-3H-2Y-3H-1Y-3H-1Y-0H			37.0	20.0	3.0	6.0	8.0	6.0
82	(RRV-WJ15/BJ"S"-ON(2) X BON)NAC CM65202-3H-2Y-3H-2Y-0H			37.0	26.7	1.0	7.0	8.0	6.0
83	(RRV-WJ15/BJ"S"-ON(2) X BON)NAC CM65202-3H-2Y-3H-4Y-0H			37.0	13.3	1.0	6.0	8.0	5.0

Table 2. Continued

VTY NO.	VARIETY OR CROSS AND PEDIGREE	GRAIN	ORIGIN	NUMBER OF OBSERVATIONS:						
				YIELD KG/HA	HEAD DAYS	HAT DAYS	LEAF RUST	STEM RUST	PLNT HT	LODC %
				(13)	(15)	(13)	(5)	(1)	(16)	(1)
84	MN72131-MOR"S" CM65423-1M-1Y-3M-2Y-0M			3341.5	86.1	127.6	3.3	8.0	90.2	0.0
85	YD"S"-VEE"S" CM65723-1M-1Y-1M-2Y-1M-1Y-0M			3286.5	86.9	128.4	1.0	24.0	88.8	0.0
86	(4777(2) X FKN-GB/VEE"S")BUC"S"-PVN" CM66684-B-1M-4Y-2M-2Y-2M-1Y-0Y			2962.5	87.3	129.6	2.2	16.0	77.7	0.0
87	(4777(2) X FKN-GB/VEE"S")BUC"S"-PVN" CM66684-B-1M-6Y-1M-1Y-1M-1Y-0M			3429.2	90.9	131.1	1.0	16.0	85.1	0.0
88	(4777(2) X FKN-GB/VEE"S")BUC"S"-PVN" CM66684-B-1M-6Y-2M-2Y-0M			2949.5	83.3	126.2	3.0	0.0	79.1	0.0
89	(4777(2) X FKN-GB/VEE"S")BUC"S"-PVN" CM66684-B-1M-6Y-2M-2Y-1M-0Y			2916.0	82.9	127.0	5.3	2.0	79.0	0.0
90	(4777(2) X FKN-GB/VEE"S")BUC"S"-PVN" CM66684-B-1M-6Y-2M-3Y-3M-0Y			3080.9	92.3	135.5	3.3	16.0	83.6	0.0
91	(4777(2) X FKN-GB/VEE"S")BUC"S"-PVN" CM66684-B-1M-6Y-2M-3Y-3M-1Y-0M			2957.3	92.8	135.3	5.0	2.0	84.3	0.0
92	(4777(2) X FKN-GB/VEE"S")BUC"S"-PVN" CM66684-B-1M-6Y-3M-3Y-0M			2476.8	84.1	126.8	14.0	0.0	79.9	0.0
93	ALD"S"-BOW"S" CM67318-1Y-2M-2Y-1M-1Y-0M			2549.2	97.1	128.4	17.0	2.0	82.3	0.0
94	ALD"S"-BOW"S" CM67318-1Y-2M-4Y-0M			2753.2	89.9	130.8	17.0	4.0	80.9	0.0
95	VEE"S"/KAL-BB X TQFN"S" CM67412-17Y-2M-5Y-2M-0Y			2570.4	82.6	125.9	23.3	2.0	74.8	0.0
96	MOR"S"/VD"S" X BB-CHA CM67442-1M-1Y-1M-1Y-0M			3033.0	88.0	129.2	12.0	40.0	87.1	0.0
97	ANB"S"-YACQ"S" CM67618-2Y-1M-3Y-0M			2762.1	87.6	129.2	1.0	8.0	91.8	10.0
98	PF70354-YACQ"S" CM67911-4Y-1M-1Y-0Z-7Y-0M			2462.9	93.8	131.0	10.3	20.0	78.3	0.0
99	CKR"S"-HD2172 CM68199-10Y-1M-1Y-0M			3123.3	79.5	123.2	3.0	0.0	80.3	0.0
100	GENAROB1			2867.0	90.3	130.0	3.5	0.0	78.6	0.0
101	YR-TRF"S" X BOW"S" CM68336-1Y-1M-1Y-3M-1Y-0M			2979.5	82.1	125.7	6.2	20.0	83.1	0.0
102	YR-TRF"S" X BOW"S" CM68336-1Y-1M-1Y-3M-2Y-0M			2628.2	83.5	125.8	4.8	10.0	82.6	0.0
103	YR-TRF"S" X BOW"S" CM68336-1Y-1M-1Y-4M-1Y-0M			2725.4	84.1	125.9	5.0	20.0	82.1	0.0
104	VEE"S"-PEW"S" CM68367-4Y-1M-2Y-0M			2327.7	83.8	126.2	21.5	20.0	77.1	0.0
105	TUC"S"-MON"S" X BUC"S" (CMH76 1084- CMH74A 754 X CMH76 1084/BOW"S") CM68795-B-3Y-1M-4Y-3M-0Y			3059.5	80.3	123.8	0.8	0.0	82.1	0.0
106	COOK-VEE"S" X DOVE"S"-VEE"S" CM69279-C-2Y-1M-2Y-1M-0Y			2789.0	87.4	128.5	1.8	4.0	83.3	0.0
107	COOK-VEE"S" X DOVE"S"-VEE"S" CM69279-C-2Y-1M-5Y-1M-0Y			3101.1	83.8	127.1	1.5	1.0	84.4	0.0
108	PSN"S"-BOW"S" CM69560-1M-3Y-3M-5Y-0M			2909.8	87.5	129.6	0.0	2.0	84.3	0.0
109	TSH"S"-BOW"S" CM69639-9M-2Y-1M-1Y-0M			2467.5	89.8	134.8	1.3	16.0	83.9	0.0

Table 2. Continued

VTY NO.	VARIETY OR CROSS AND PEDIGREE	GRAIN	ORIGIN	NUMBER OF OBSERVATIONS:					
				1000 G. W.	CHECK MARK	PDW H 0-9	SPT B 0-9	TAN S 0-9	BYDV 0-9
				(2)	(15)	(1)	(2)	(1)	(1)
84	HN72131-HOR"S CM65423-1H-1Y-3H-2Y-0H			39.0	33.3	8.0	4.5	8.0	6.0
85	YD"S"-VEE"S" CM65723-1H-1Y-1H-2Y-1H-1Y-0H			34.5	33.3	6.0	4.0	8.0	5.0
86	(4777(2) X FXN-08/VEE"S")BUC"S"-PVM" CM66684-B-1H-4Y-2H-2Y-2H-1Y-0Y			40.0	26.7	6.0	4.5	8.0	6.0
87	(4777(2) X FXN-08/VEE"S")BUC"S"-PVM" CM66684-B-1H-6Y-1H-1Y-1H-1Y-0H			33.0	33.3	3.0	4.0	8.0	5.0
88	(4777(2) X FXN-08/VEE"S")BUC"S"-PVM" CM66684-B-1H-6Y-2H-2Y-0H			40.0	20.0	8.0	5.5	8.0	6.0
89	(4777(2) X FXN-08/VEE"S")BUC"S"-PVM" CM66684-B-1H-6Y-2H-2Y-1H-0Y			36.5	20.0	6.0	5.0	8.0	6.0
90	(4777(2) X FXN-08/VEE"S")BUC"S"-PVM" CM66684-B-1H-6Y-2H-3Y-3H-0Y			38.0	20.0	8.0	7.0	8.0	6.0
91	(4777(2) X FXN-08/VEE"S")BUC"S"-PVM" CM66684-B-1H-6Y-2H-3Y-3H-1Y-0H			36.0	26.7	6.0	6.0	8.0	5.0
92	(4777(2) X FXN-08/VEE"S")BUC"S"-PVM" CM66684-B-1H-6Y-3H-3Y-0H			40.5	33.3	6.0	5.0	8.0	5.0
93	ALD"S"-BOW"S" CM67318-1Y-2H-2Y-1H-1Y-0H			36.0	13.3	8.0	5.0	7.0	6.0
94	ALD"S"-BOW"S" CM67318-1Y-2H-4Y-0H			31.0	13.3	8.0	5.5	8.0	6.0
95	VEE"S"/KAL-88 X TGFN"S" CM67412-17Y-2H-3Y-2H-0Y			36.0	6.7	8.0	5.0	8.0	6.0
96	HOR"S"/YD"S" X BB-CHA CM67442-1H-1Y-1H-1Y-0H			36.5	26.7	3.0	5.0	8.0	6.0
97	AMB"S"-YACO"S" CM67618-2Y-1H-3Y-0H			35.5	33.3	3.0	6.0	8.0	6.0
98	FF70334-YACO"S" CM67911-4Y-1H-1Y-0Z-7Y-0H			26.0	20.0	6.0	4.5	8.0	6.0
99	CKR"S"-HD2172 CM68199-10Y-1H-1Y-0H			34.0	44.7	8.0	5.5	8.0	5.0
100	GENAROS1			31.0	20.0	8.0	5.0	8.0	7.0
101	VR-TRF"S" X BOW"S" CM68336-1Y-1H-1Y-3H-1Y-0H			39.0	13.3	3.0	7.0	8.0	6.0
102	VR-TRF"S" X BOW"S" CM68336-1Y-1H-1Y-3H-2Y-0H			37.0	40.0	3.0	7.0	8.0	7.0
103	VR-TRF"S" X BOW"S" CM68336-1Y-1H-1Y-4H-1Y-0H			38.0	20.0	3.0	5.5	8.0	6.0
104	VEE"S"-PEW"S" CM68367-4Y-1H-2Y-0H			40.0	13.3	6.0	6.0	8.0	7.0
105	TUC"S"-HOM"S" X BUC"S"(CMH76.1084- CMH74A.754 X CMH76.1084/BOW"S") CM68795-B-3Y-1H-4Y-3H-0Y			45.0	20.0	6.0	6.0	8.0	6.0
106	COOK-VEE"S" X DOVE"S"-VEE"S" CM69279-C-2Y-1H-2Y-1H-0Y			30.0	13.3	3.0	5.0	8.0	7.0
107	COOK-VEE"S" X DOVE"S"-VEE"S" CM69279-C-2Y-1H-5Y-1H-0Y			31.0	26.7	6.0	5.0	8.0	7.0
108	PSN"S"-BOW"S" CM69360-1H-3Y-3H-5Y-0H			33.0	20.0	8.0	5.5	8.0	7.0
109	TSM"S"-BOW"S" CM69639-9H-2Y-1H-1Y-0H			29.5	20.0	3.0	4.0	7.0	7.0

Table 2. Continued

VTY NO.	VARIETY OR CROSS AND PEDIGREE	GRAIN ORIGIN	YIELD KG/HA	HEAD DAYS	MAT DAYS	LEAF RUST	STEM RUST	PLNT HT	LODDG X	1000 G.W.	CHECK MARK	PDW M 0-9	SPT B 0-9	TAN B 0-9	BYDV 0-9
		NUMBER OF OBSERVATIONS:	(13)	(15)	(13)	(5)	(1)	(16)	(1)	(2)	(15)	(1)	(2)	(1)	(1)
110	TBM"S"-BOW"S" CM69639-9M-2Y-2M-1Y-0M		2202.0	89.2	131.8	3.0	8.0	82.6	0.0	28.0	20.0	6.0	4.0	8.0	6.0
111	QZ75-TAN"S" CM69801-1M-2Y-4M-2Y-0M		2702.9	90.0	131.2	1.0	8.0	92.9	0.0	36.0	6.7	6.0	5.0	8.0	7.0
112	BOW"S"-PRL"S" CM70307-9M-3Y-1M-2Y-0M		3338.5	87.9	131.8	0.8	32.0	86.4	0.0	38.0	40.0	6.0	4.0	8.0	7.0
113	NS713-PCI"S" X VEE#3 CM70013-3M-1Y-1M-2Y-0M		2570.8	80.1	124.1	33.0	60.0	95.0	0.0	41.0	0.0	1.0	5.0	8.0	7.0

Table 3. Top performing lines: yield.

LOCATIONS	CONTINENT	COUNTRY	AREA	VARIABLES INCLUDED
1	AFRICA	EGYPT	MENA	1
3	AFRICA	ZIMBABWE	CHIREZI	1
4	ASIA	BANGLADESH	JESSORE (1ST. DATE)	1
5	ASIA	BURMA	YE-U (SAGAIN DIV.)	1
6	ASIA	CHINA	BEIJING	1
9	ASIA	PAKISTAN	PUNJAB-BAHAWALPUR	1
11	ASIA	PAKISTAN	SIND	1
12	ASIA	THAILAND	NAKHON RATCHSIMA	1
13	CENTRAL AMERICA	COSTA RICA	ALAJUELA-FABIO BAUDRIT	1
14	NORTH AMERICA	MEXICO	EBANO S. L. P.	1
19	SOUTH AMERICA	BRAZIL	PARANA-LONDRINA	1
20	SOUTH AMERICA	BRAZIL	PARANA-PALOTINA	1
21	SOUTH AMERICA	BRAZIL	SAO PAULO-CAMPINAS	1

*VARIABLE IDENTIFICATIONS
 1 YIELD KG/HA

Table 3. Continued

VTY NO.	VARIETY OR CROSS AND PEDIGREE	LOCATIONS													MEAN
		1	3	4	5	6	9	11	12	13	14	19	20	21	
13	ALDAN"S"-1A858 CM53481-6Y-1Y-4M-1Y-1M-1Y-0M	4666	7968	633	2392	2626	3993	5866	2039	1966	3750	4940	6296	1742	3759.8
9	VEE"S" CM33027-F-15M-500Y-0M-98B-0Y	4133	8448	1982	1947	1919	4676	5066	2333	2455	---	---	6222	1242	3674.8
15	BUC"S"-BJY"S" CM49641-9Y-1M-1Y-3Y-0M	1599	7648	1136	1836	4343	7145	6133	1933	2499	---	---	---	2108	3638.0
7	VEE"S" CM33027-F-15M-4Y-4M-3Y-2M-1Y-0M	3599	9456	1497	1627	2626	4247	6466	1626	3133	---	---	5407	2117	3618.3
10	VEE"S" CM33027-F-15M-500Y-0M-115B-0Y	6133	8400	1259	2084	1666	3400	6133	2266	1999	---	---	---	2600	3594.0
39	TTR"S"-JUN"S" CM59123-4M-1Y-1M-1Y-0M	2000	10608	1667	1294	3535	3500	6000	1026	1533	4062	---	5407	2350	3581.8
23	ALD"S"-BAP"S"(L. S. J. 1-PI X HAYA"S"(2 /TRM) CM57828-A-2Y-1Y-1M-1Y-1M-4Y-0M	5066	7904	1265	1908	4999	3660	4933	1853	866	---	---	5259	1142	3532.3
6	VEE#9 CM33027-F-12M-1Y-12M-1Y-2M-0Y	3733	8448	1273	1555	2676	4440	5333	1426	1999	---	---	5556	2308	3522.5
1	NE1"S" CM45855-30M-1Y-4M-1Y-1M-1Y-0B	4266	8304	1474	483	2222	4893	5733	2186	1699	---	---	4815	2542	3510.6
50	MON"S"-IMU CM61942-5Y-1M-1Y-1M-0Y	6666	6128	1534	1385	2929	2267	4666	2093	2111	4375	---	4741	2767	3471.8
22	BUC"S"(TZPP X IRN46-CND67/PRT) CM56744-7Y-2Y-1M-1Y-0M	4000	8432	1679	1026	3030	3333	4800	2106	2344	---	---	5333	2033	3465.1
30	PAN"S"-BUC"S" CM58797-4Y-1M-1Y-2M-2Y-2M-0Y	3866	8064	918	1751	4545	2800	6066	2293	1966	---	---	---	2150	3441.9
21	BUC"S"-PUN"S" CM52359-12M-1Y-2Y-3M-1Y-3M-0Y	5066	7744	1531	1627	4848	3313	5266	1746	2188	2812	3060	---	2033	3436.2
87	(4777(2) X FKN-08/VEE"S")BUC"S"-PUN" CM66684-B-1M-6Y-1M-1Y-1M-1Y-0M	3333	8352	1388	1679	3080	3093	6000	1306	1499	---	2875	5778	2767	3429.2
81	(RRV-WW15/BJ"S"-ON(2) X BON)NAC CM65202-3M-2Y-3M-1Y-3M-1Y-0M	4800	7440	2118	973	3989	3833	6533	1106	1666	3125	---	---	2100	3425.7
20	GENARDB1	3866	7200	2534	1464	2525	3233	4666	1266	2244	---	---	5852	2575	3402.3
25	SPT"S" CM58478-B-2Y-1Y-2M-2Y-0M	2400	8944	1556	1705	3181	3507	5466	1439	1211	---	3060	5630	2025	3343.7
84	MN72131-MOR"S" CM65423-1M-1Y-3M-2Y-0M	5600	6912	2118	1843	4090	1200	5133	1519	1933	---	---	---	3067	3341.5
112	BON"S"-PRL"S" CM70307-9M-3Y-1M-2Y-0M	3266	5376	1572	1803	4242	4007	5200	2253	3533	---	---	---	2133	3338.5
2	F3.71-TRM CM63704-10Y-1M-3Y-1M-1Y-0B	3333	7616	2780	1392	3383	1873	4133	2159	2511	4687	---	---	2717	3325.8
85	VD"S"-VEE"S" CM65723-1M-1Y-1M-2Y-1M-1Y-0M	4400	6240	1113	1803	3282	3473	6333	1093	1955	3125	---	4963	1658	3286.5
8	VEE"S" CM33027-F-15M-500Y-0M-66B-0Y	2666	7280	2893	1620	2373	3827	5333	2039	911	---	---	4815	2050	3255.2
4	TAN"S" CM30697-2M-8Y-7M-0Y	3333	7216	2152	1967	2626	4480	5333	1506	1644	---	---	---	2167	3242.4
82	(RRV-WW15/BJ"S"-ON(2) X BON)NAC CM65202-3M-2Y-3M-2Y-0M	1866	7904	1863	1450	5050	3460	5733	1119	1766	3125	---	---	2100	3221.5
80	GENARDB1	4666	7104	834	1013	2525	3387	5800	799	1599	---	---	5333	2017	3188.8
43	PJ-CAL X EMU"S"/KA"S"-BCH"S" CM60443-A-2Y-1M-2Y-2M-3Y-1M-0Y	5200	5824	1420	1581	3282	3760	4933	333	3244	---	---	---	2183	3176.0
19	BUC"S"-BUL"S" CM50659-3Y-1M-3Y-0Y	2599	7136	1174	1986	4999	2973	5200	2079	2933	---	2125	---	1717	3174.6

Table 3. Continued

VTY NO.	VARIETY OR CROSS AND PEDIGREE	LOCATIONS														MEAN
		1	3	4	5	6	9	11	12	13	14	19	20	21		
41	TTR"S"-JUN"S" CM59123-4M-1Y-2M-3Y-3M-1Y-0M	3600	6608	1312	947	4848	3420	5733	413	1366	4375	---	---	2283	3173.2	
73	R37-OHL121 X KAL-BB/KLT"S" CM64609-5Y-4M-4Y-0M	4000	7040	1534	1026	3787	4047	5333	666	1866	3125	3060	---	2433	3159.8	
5	VEE"S" CM33027-F-12M-1Y-1M-1Y-1M-0Y-60B-0Y-1PTZ-0Y	3466	6400	1200	1535	2575	4033	4600	1693	977	---	---	5852	2325	3150.5	
71	MYNA"S"-VUL"B" CM64546-2M-1Y-1M-5Y-1M-2Y-0M	4533	5824	2191	1339	4797	2973	4800	493	1555	---	---	4000	2142	3149.7	
56	VEE"S"-BUC"S" CM61950-9Y-3M-1Y-1M-5Y-0M	2666	7200	2124	1588	3333	3693	4666	1693	2188	---	2250	3926	2383	3142.5	
38	TTR"S"-JUN"S" CM59123-3M-1Y-1M-4Y-1M-1Y-0M	1866	6576	1096	941	3080	2320	6200	1559	1988	---	---	6667	2142	3130.5	
99	CKR"S"-HD2172 CM68199-10Y-1M-1Y-0M	3600	6880	889	1366	2777	3780	5200	1893	2488	---	3375	---	2108	3123.3	
3	F3.71-TRM BM6704-10Y-1M-3Y-3M-2Y-3M-0Y	3066	5888	1137	1627	2828	4753	4666	1399	1155	---	---	5185	2517	3111.0	
107	COOK-VEE"S" X DOVE"S"-VEE"S" CM69279-C-2Y-1M-3Y-1M-0Y	4666	5792	2424	1758	3434	3780	4066	1426	1999	3125	---	---	1642	3101.1	
40	GENAROB1	6799	5264	1192	640	1969	1800	8267	573	1633	937	---	5259	2767	3091.7	
90	(4777(2) X FKN-0B/VEE"S")BUC"S"-PVN" CM66684-B-1M-6Y-2M-3Y-3M-0Y	3200	8416	819	1457	2727	3300	3600	1279	1277	---	2750	6296	1850	3080.9	
59	MON"S" X SIS"S"-CAN"S" CM62142-5Y-2M-1Y-2M-1Y-0M	1866	8048	2850	1287	3181	2500	4800	1399	2288	---	3125	---	2517	3078.3	
62	MON"S" X SIS"S"-CAN"S" CM62142-5Y-3M-1Y-1M-3Y-0M	4133	5936	1691	1339	3282	2967	4733	1719	2822	---	2690	---	2517	3075.4	
105	TUC"S"-MON"S" X BUC"S"(CM476.1084-CM474A.754 X CM476.1084/BDM"S") CM68795-B-3Y-1M-4Y-3M-0Y	3066	6992	729	1444	2626	4693	4800	1799	2988	---	---	---	1458	3059.5	
61	MON"S" X SIS"S"-CAN"S" CM62142-5Y-2M-1Y-1M-5Y-0M	2533	7632	1899	843	2727	3000	4266	1706	2188	4375	---	---	2300	3039.0	
96	MOR"S"/YD"S" X BB-CHA CM67442-1M-1Y-1M-1Y-0M	3066	7296	744	1627	3787	3553	4266	1919	1855	---	---	---	2217	3033.0	
42	F6.74-BUN"S" X SIS"S" CM60042-M-1Y-2M-2Y-1M-2Y-0M	3200	6736	1216	1281	4393	2267	3066	466	2133	5312	---	---	3233	3027.5	
24	ALD"S"-DOVE"S" X ALDAN"S"-PF70354 CM58273-D-2Y-3Y-3M-1Y-1M-1Y-0M	4000	6336	2255	771	3383	3393	4666	1159	2111	---	---	---	2000	3007.4	
36	KEA"S"-TDM"S" CM58975-2Y-3M-1Y-7M-2Y-0M	2000	6640	1860	1352	1616	3367	4666	1399	3155	---	2875	5259	1867	3004.7	
14	BUC"S"-BJY"S" CM49641-9Y-1M-4Y-0Y	4533	5696	977	1535	3434	3767	4533	1759	2077	---	2940	---	1792	3003.9	
74	R37-OHL121 X KAL-BB/KLT"S" CM64609-6Y-1M-2Y-0M	3466	5904	1486	1424	3787	1900	5733	546	1733	---	---	5037	2008	3002.2	

Table 4. Top performing lines: earliest heading.

LOCATIONS	CONTINENT	COUNTRY	AREA	VARIABLES INCLUDED
1	AFRICA	EGYPT	KENA	3
2	AFRICA	EGYPT	SOHAG	3
3	AFRICA	ZIMBABWE	CHIREDDZI	3
4	ASIA	BANGLADESH	JESSORE (1ST. DATE)	3
5	ASIA	BURMA	YE-U (SAGAIN DIV.)	3
7	ASIA	CHINA	NANJING-JIANGSU	3
8	ASIA	NEPAL	RUPANDEHI	3
9	ASIA	PAKISTAN	PUNJAB-BAHAWALPUR	3
10	ASIA	PAKISTAN	PUNJAB-NIAB	3
11	ASIA	PAKISTAN	BIND	3
13	CENTRAL AMERICA	COSTA RICA	ALAJUELA-FABIO BAUDRIT	3
14	NORTH AMERICA	MEXICO	EBANO S. L. P.	3
15	NORTH AMERICA	MEXICO	EL BATAN	3
18	SOUTH AMERICA	BOLIVIA	SANTA CRUZ-CIAT	3
19	SOUTH AMERICA	BRAZIL	PARANA-LONDRINA	3

*VARIABLE IDENTIFICATIONS
3 HEAD DAYS

Table 4. Continued

VITY NO	VARIETY OR CROSS AND PEDIGREE	LOCATIONS																	MEAN
		1	2	3	4	5	7	8	9	10	11	13	14	15	18	19			
66	HD669-1B-VRE"S" CM6253B-1Y-2M-2Y-1M-1Y-0M	80	79	66	49	47	177	66	88	105	67	49	67	68	56	62	75.1		
67	HI669(TOR"S"-HDB32(2) X TOB/TOR"S"-HDB32(2)) CM62550-1Y-1M-2Y-1M-1Y-0M	80	79	66	49	47	178	66	92	105	67	51	67	68	57	62	75.6		
24	ALD"S"-DOVE"S" X ALDAN"S"-PF70354 CM58273-D-2Y-5Y-3M-1Y-1M-1Y-0M	86	79	66	49	49	178	69	89	105	71	50	68	69	59	61	76.5		
28	PAN"S"-BUC"S" CM58797-4Y-1M-1Y-1M-4Y-0M	83	87	68	52	46	177	69	90	101	69	49	75	68	55	61	76.7		
17	CC-TOB(2) X MN72131 CM50308-5Y-3M-3Y-1Y-2M-0Y	79	79	66	56	47	178	70	94	104	69	55	68	70	57	61	76.9		
18	CC-TOB(2) X MN72131 CM50308-5Y-3M-3Y-2Y-1M-0Y	79	79	66	55	48	178	71	94	104	69	56	68	69	57	61	76.9		
16	CC-TOB(2) X MN72131 CM50308-5Y-3M-1Y-1Y-1M-0Y	84	81	66	55	47	178	70	93	104	69	55	68	70	59	61	77.3		
35	TTR"S"-TTH"S" CM58956-1Y-1M-2Y-1M-2Y-0M	81	83	66	52	49	179	72	95	110	76	51	67	68	57	63	77.9		
11	VEE#6 CM33027-I-2M-1Y-1M-1Y-3M-0Y	82	86	70	56	49	180	74	94	105	68	49	66	69	60	62	78.0		
53	MRL"S"-BUC"S" CM61949-3M-4Y-1M-5Y-0M	82	83	66	55	49	180	74	99	109	70	50	67	69	56	63	78.1		
34	DOVE"S"-TSI CM58992-6Y-4M-1Y-1M-4Y-0M	82	87	66	52	49	178	70	92	119	72	50	67	69	54	67	78.3		
15	BUC"S"-BJY"B" CM49641-9Y-1M-1Y-5Y-0M	79	87	68	55	49	181	72	100	109	71	49	67	69	57	63	78.4		
47	H546.71(2)-H567.71 X AUFN(EMU"S"/ TOB-ERA X TOB-CNO67) CM61636-A-5Y-1M-1Y-1M-2Y-3M-0Y	81	85	68	55	52	181	72	96	105	72	50	67	70	56	67	78.5		
32	DOVE"S"-BUC"S" CM58808-27Y-2M-10Y-1M-0Y	84	87	68	52	49	181	74	98	110	74	49	68	68	56	63	78.7		
48	H546.71(2)-H567.71 X AUFN(EMU"S"/ TOB-ERA X TOB-CNO67) CM61636-A-5Y-1M-1Y-1M-3Y-2M-0Y	80	83	68	55	53	181	73	97	105	74	50	67	70	57	67	78.7		
46	L2266-1406.101 X BUC"S"/VPH-MOS 83.1 4.8 X NAC CM61550-C-1Y-1M-1Y-1M-1Y-3M-0Y	82	85	68	55	52	180	73	96	105	74	50	68	70	60	67	79.0		
31	DOVE"B"-BUC"S" CM58808-27Y-2M-6Y-2M-2Y-0M	86	87	68	52	49	180	72	98	110	76	49	68	68	57	67	79.1		
45	L2266-1406.101 X BUC"S"/VPH-MOS 83.1 4.8 X NAC CM61550-C-1Y-1M-1Y-1M-1Y-2M-0Y	83	87	68	55	52	180	73	96	107	75	50	68	70	60	63	79.1		
52	MRL"S"-BUC"S" CM61949-3M-4Y-1M-3Y-1M-0Y	84	86	68	55	52	181	74	98	110	74	50	67	69	56	67	79.4		
61	MON"S" X SIS"S"-CAN"S" CM62142-5Y-2M-1Y-1M-5Y-0M	90	83	66	62	52	177	76	98	105	77	56	68	68	60	63	79.4		
83	(RRV-NW15-BJY"S"-ON(2) X BON)NAC CM65802-3M-2Y-3M-4Y-0M	93	86	68	57	49	178	77	100	105	76	56	67	69	58	62	79.4		
56	VEE"C"-BUC"S" CM61950-9Y-3M-1Y-1M-5Y-0M	82	85	68	58	49	182	72	99	111	75	50	67	70	57	67	79.5		
79	(MAYA"S"/GLL-AUSTITIA1.157 X CNO67- NO)YACD"S" CM64991-2M-2Y-1M-1Y-0M	83	87	68	55	52	181	73	101	105	76	57	67	68	57	63	79.5		
81	(RRV-NW15-BJY"S"-ON(2) X BON)NAC CM65802-3M-2Y-3M-1Y-3M-1Y-0M	98	86	68	56	51	178	74	95	105	76	56	67	69	58	63	79.5		
82	(RRV-NW15-BJY"S"-ON(2) X BON)NAC CM65802-3M-2Y-3M-2Y-0M	95	86	68	56	51	178	74	99	105	76	56	67	69	59	63	79.5		

Table 4. Continued

VTY NO.	VARIETY OR CROSS AND PEDIGREE	LOCATIONS																	MEAN
		1	2	3	4	5	7	8	9	10	11	13	14	15	18	19			
99	CKR"S"-HD2172 CM68199-10Y-1M-1Y-0M	80	83	68	62	55	179	73	101	107	72	54	68	70	57	63	79.5		
14	BUC"S"-BJY"S" CM49641-9Y-1M-4Y-0Y	84	85	70	56	49	180	72	100	119	75	49	67	69	59	62	79.7		
98	MON"S" X SIS"S"-CAN"S" CM62142-5Y-2M-1Y-1M-3Y-0M	79	83	66	61	57	178	73	98	110	77	56	67	68	60	63	79.7		
59	MON"S" X SIS"S"-CAN"S" CM62142-5Y-2M-1Y-2M-1Y-0M	79	83	66	61	57	178	73	98	109	77	56	69	68	60	62	79.7		
34	MRL"S"-BUC"S" CM61949-13Y-1M-2Y-1M-1Y-0M	85	87	68	56	52	182	75	99	111	76	50	67	69	55	67	79.9		
55	MRL"S"-BUC"S" CM61949-13Y-1M-2Y-1M-1Y-1M-0Y	83	87	68	58	52	183	74	98	111	76	50	67	69	56	67	79.9		
65	PRL"S"-ALD"S" CM62304-64LB-1B-1Y-1M-2Y-0M	87	87	68	57	49	181	73	100	114	77	49	67	65	61	63	79.9		
51	MRL"S"-BUC"S" CM61949-3M-4Y-1M-1Y-1M-0Y	85	87	66	56	52	182	75	101	110	74	50	67	69	56	71	80.1		
113	NS713-PCI"S" X VEE#3 CM70013-3M-1Y-1M-2Y-0M	89	88	66	65	50	181	74	99	107	69	54	65	70	54	70	80.1		
19	BUC"S"-BUL"S" CM50609-3Y-1M-3Y-0Y	84	87	68	55	50	181	74	101	109	76	53	70	70	60	66	80.3		
68	NAC-VEE"S" CM64224-5Y-1M-1Y-0M	89	86	66	58	49	181	73	100	112	77	50	67	68	65	63	80.3		
105	TUC"S"-MON"S" X BUC"S" (CMH76.1084- CMH74A.734 X CMH76.1084/BOM"S") CM68795-3-3Y-1M-4Y-3M-0Y	82	87	66	63	55	178	74	98	109	73	51	67	70	61	70	80.3		
57	MON"S" X SIS"S"-CAN"S" CM62142-5Y-2M-1Y-1M-2Y-0M	80	81	66	61	57	178	74	102	110	77	56	68	68	61	67	80.4		
12	LIRA"S" CM43903-4-4Y-1M-2Y-1M-1Y-0B	81	83	70	61	55	180	75	99	107	76	56	71	70	62	62	80.5		
29	PAM"S"-BUC"S" CM58797-4Y-1M-1Y-2M-1Y-0M	82	87	68	60	53	178	75	99	107	79	54	75	68	63	63	80.7		
74	R37-OHL121 X KAL-BB/KLT"S" CM64609-6Y-1M-2Y-0M	85	89	70	65	49	178	73	101	112	77	55	67	69	60	63	80.9		

Table 5. Top performing lines: maturity.

LOCATIONS	CONTINENT	COUNTRY	AREA	VARIABLES INCLUDED
1	AFRICA	EGYPT	KENA	4
2	AFRICA	EGYPT	SOHAG	4
3	AFRICA	ZIMBABWE	CHIREDEZI	4
4	ASIA	BANGLADESH	JESSORE (1ST. DATE)	4
5	ASIA	BURMA	YE-U (SAGAIN DIV.)	4
7	ASIA	CHINA	NANJING-JIANGSU	4
8	ASIA	NEPAL	RUPANDEHI	4
9	ASIA	PAKISTAN	PUNJAB-SAHAWALPUR	4
10	ASIA	PAKISTAN	PUNJAB-NIAB	4
11	ASIA	PAKISTAN	SIND	4
13	CENTRAL AMERICA	COSTA RICA	ALAJUELA-FABIO BAUDRIT	4
14	NORTH AMERICA	MEXICO	EBAND S. L. P.	4
15	NORTH AMERICA	MEXICO	EL BATAN	4

*VARIABLE IDENTIFICATIONS
 4 MAT DAYS

Table 5. Continued

VTY NO	VARIETY OR CROSS AND PEDIGREE	LOCATIONS														MEAN
		1	2	3	4	5	7	8	9	10	11	13	14	15		
64	HD669 18-VRE"S" CM62538-1Y-2M-2Y-1M-1Y-0M	126	134	108	83	105	183	107	135	142	128	90	96	120	119.8	
67	HI669(TOR"S"-HD832(2) X TOR/TOR"S"- HD832(2)) CM62550-1Y-1M-2Y-1M-1Y-0M	126	134	108	83	105	184	107	137	142	128	90	95	120	119.9	
24	ALD"S"-DOVE"S" X ALDAN"S"-PF70354 CM58273-D-2Y-5Y-3M-1Y-1M-1Y-0M	131	129	115	83	107	183	106	135	139	126	90	109	121	120.8	
16	CC-TDB(2) X NN72131 CM50308-5Y-3M-1Y-1Y-1M-0Y	131	129	108	86	104	184	109	137	142	128	90	106	125	121.5	
17	CC-TDB(2) X NN72131 CM50308-5Y-3M-3Y-1Y-2M-0Y	126	129	113	86	104	184	109	138	144	128	90	104	126	121.6	
11	VEE#6 CM33027-1-2M-1Y-1M-1Y-3M-0Y	129	134	108	86	106	185	112	140	145	124	90	102	125	122.0	
18	CC-TDB(2) X NN72131 CM50308-5Y-3M-3Y-2Y-1M-0Y	122	131	108	86	105	184	111	141	147	128	90	108	126	122.1	
32	DOVE"S"-BUC"S" CM58808-27Y-2M-10Y-1M-0Y	131	129	113	83	105	185	111	140	146	136	85	104	126	122.6	
61	MON"S" X SIS"S"-CAN"S" CM62142-5Y-2M-1Y-1M-5Y-0M	126	124	108	88	110	184	110	139	144	129	99	107	126	122.6	
34	DOVE"S"-TSI CM58952-6Y-4M-1Y-1M-4Y-0M	129	140	115	83	105	185	109	138	144	136	90	102	121	122.8	
58	MON"S" X SIS"S"-CAN"S" CM62142-5Y-2M-1Y-1M-3Y-0M	124	125	108	86	123	184	109	137	149	129	99	99	126	122.9	
35	TTR"S"-TTH"S" CM58956-1Y-1M-2Y-1M-2Y-0M	129	136	108	86	105	185	111	138	146	138	90	106	121	123.0	
28	PAM"S"-BUC"S" CM58797-4Y-1M-1Y-1M-4Y-0M	126	139	115	83	105	184	108	138	139	136	90	115	122	123.1	
99	CRK"S"-HD2172 CM68199-10Y-1M-1Y-0M	128	134	108	88	112	184	109	143	144	130	90	102	130	123.2	
47	H546.71(2)-H567.71 X AUFN(EMU"S"/ TDB-ERA X TDB-CND67) CM61636-A-5Y-1M-1Y-1M-2Y-3M-0Y	126	138	113	86	110	185	109	138	148	130	85	108	127	123.3	
54	MRL"S"-BUC"S" CM61949-13Y-1M-2Y-1M-1Y-0M	122	139	108	86	110	185	112	142	150	134	85	104	126	123.3	
48	H546.71(2)-H567.71 X AUFN(EMU"S"/ TDB-ERA X TDB-CND67) CM61636-A-5Y-1M-1Y-1M-3Y-2M-0Y	126	136	118	86	102	185	109	138	148	133	90	106	127	123.4	
57	MON"S" X SIS"S"-CAN"S" CM62142-5Y-2M-1Y-1M-2Y-0M	122	125	108	86	123	184	109	141	149	129	99	104	125	123.4	
45	L2266-1406.101 X BUC"S"/VPH-MDS B3.1 4. B X NAC CM61550-C-1Y-1M-1Y-1M-1Y-2M-0Y	126	138	113	86	110	185	109	138	148	130	90	106	126	123.5	
46	L2266-1406.101 X BUC"S"/VPH-MDS B3.1 4. B X NAC CM61550-C-1Y-1M-1Y-1M-1Y-3M-0Y	126	137	113	86	110	185	109	138	147	130	90	108	126	123.5	
55	MRL"S"-BUC"S" CM61949-13Y-1M-2Y-1M-1Y-1M-0Y	122	139	108	85	110	185	112	137	151	136	90	104	126	123.5	
31	DOVE"S"-BUC"S" CM58808-27Y-2M-6Y-2M-2Y-0M	131	136	113	83	106	185	109	139	147	138	85	106	129	123.6	
56	VEE"S"-BUC"S" CM61950-9Y-3M-1Y-1M-5Y-0M	122	140	113	86	107	185	109	141	151	136	90	104	123	123.6	
68	NAC-VEE"S" CM64224-5Y-1M-1Y-0M	136	136	108	89	106	185	112	143	147	137	90	95	123	123.6	
59	MON"S" X SIS"S"-CAN"S" CM62142-5Y-2M-1Y-2M-1Y-0M	136	131	108	86	115	183	109	141	149	129	99	101	123	123.8	
62	MON"S" X SIS"S"-CAN"S" CM62142-5Y-3M-1Y-1M-3Y-0M	126	126	113	89	118	183	116	139	144	129	99	100	127	123.8	
105	TUC"S"-MON"S" X BUC"S"(CMH76.1084- CMH74A.754 X CMH76.1084/BOM"S") CM68795-B-3Y-1M-4Y-3M-0Y	133	136	108	88	117	184	112	139	145	133	90	97	127	123.8	
12	LIRA"S" CM43903-H-4Y-1M-2Y-1M-1Y-08	131	136	108	87	115	185	109	140	140	128	99	108	126	124.0	
30	PAM"S"-BUC"S" CM58797-4Y-1M-1Y-2M-2Y-2M-0Y	126	134	113	87	116	184	112	139	134	138	90	116	123	124.0	

Table 6. Top performing lines: leaf rust.

LOCATIONS	CONTINENT	COUNTRY	AREA	VARIABLES INCLUDED
9	ASIA	BURMA	YE-U (SAGAIN DIV.)	7
14	NORTH AMERICA	MEXICO	EBAND S L. P.	7
15	NORTH AMERICA	MEXICO	EL SATAN	7
18	SOUTH AMERICA	BOLIVIA	SANTA CRUZ-CIAT	7
19	SOUTH AMERICA	BRAZIL	PARANA-LONDRINA	7

*VARIABLE IDENTIFICATIONS
7 LEAF RUST

VTY NO.	VARIETY OR CROSS AND PEDIGREE	LOCATIONS					MEAN
		9	14	15	18	19	
19	BUC"S"-BUL"S" CM90609-3Y-1M-3Y-0Y	----	TR	TR	THR-R	TR	0.0
22	BUC"S" (TZPP X IRN46-CND67/PRT) CM56744-7Y-2Y-1M-1Y-0M	----	OR	TR	TR	TR	0.0
74	R37-ONL121 X KAL-BB/KLT"S" CM64609-6Y-1M-2Y-0M	----	OR	TR	TR	0	0.0
108	FSN"S"-BOM"S" CM69560-1M-3Y-3M-3Y-0M	----	OR	TR	THR	THR	0.0
76	MON"S"-MON"S" CM64736-6Y-2M-1Y-0M	----	TR	SHR	TR	TR	0.5
63	MON"S" X SIS"S"-CAN"S" CM62142-5Y-3M-1Y-2M-1Y-0M	----	OR	SHR	TR	----	0.7
24	ALD"S"-DOVE"S" X ALDAN"S"-PF70354 CM58273-D-2Y-5Y-3M-1Y-1M-1Y-0M	----	SR	SHR	TR	0	0.8
50	MON"S"-IMU CM61942-5Y-1M-1Y-1M-0Y	----	OR	SHR	TR	TMS	0.8
78	KAL-BB X MON"S"/CNR"S"-ANA X CNDR"S" -HUS"S" CM64767-9Y-3M-3Y-1M-0Y	----	OR	SHR	TR	TMS	0.8
105	TUC"S"-MON"S" X BUC"S" (CMH76.1084- CMH74A.754 X CMH76.1084/BOM"S") CM68795-B-3Y-1M-4Y-3M-0Y	----	OR	SHR	TR	TR	0.8
112	BOM"S"-PRL"S" CM70307-9M-3Y-1M-2Y-0M	----	OR	TR	10MR-R	TR	0.8
33	SIS"S"-VEE"S" CM58831-3M-2Y-2M-2Y-1M-1Y-0M	----	OR	SHR	TR	SHR	1.0
42	F6.74-BUN"S" X SIS"S" CM60042-N-1Y-2M-2Y-1M-2Y-0M	----	OR	TR	TR	SMS	1.0
57	MON"S" X SIS"S"-CAN"S" CM62142-5Y-2M-1Y-1M-2Y-0M	----	OR	SH	TR	TMS	1.0
61	MON"S" X SIS"S"-CAN"S" CM62142-5Y-2M-1Y-1M-3Y-0M	----	OR	10MR	TR	0	1.0
77	KAL-BB X MON"S"/CNR"S"-ANA X CNDR"S" -HUS"S" CM64767-9Y-1M-4Y-1M-0Y	----	OR	10MR	TR	0	1.0
85	YD"S"-VEE"S" CM65723-1M-1Y-1M-2Y-1M-1Y-0M	----	OR	SHR	10R	TR	1.0
87	(4777(2) X FXN-OB/VEE"S") BUC"S"-PVM" CM66684-B-1M-6Y-1M-1Y-1M-1Y-0M	----	OR	THR	TR	SMS	1.0
97	ANB"S"-YACO"S" CM67618-2Y-1M-3Y-0M	----	SR	SHR	THR	TMS	1.0
111	GZ75-TAN"S" CM69801-1M-2Y-4M-2Y-0M	----	OR	10MR	TR	TR	1.0
45	L2266-1406.101 X BUC"S"/VPH-MOS B3.1 .4.8 X NAC CM61550-C-1Y-1M-1Y-1M-1Y-2M-0Y	----	OR	TR	10R-MR	SHR	1.3
109	TSH"S"-BOM"S" CM69639-9M-2Y-1M-1Y-0M	----	OR	SR	THR	10MR	1.3
41	TTR"S"-JUN"S" CM59123-4M-1Y-2M-3Y-3M-1Y-0M	----	OR	SHR	TR	SMS	1.5
66	HD669.1B-VRE"S" CM62538-1Y-2M-2Y-1M-1Y-0M	----	OR	10M	TR	TR	1.5
107	COOK-VEE"S" X DOVE"S"-VEE"S" CM69279-C-2Y-1M-5Y-1M-0Y	----	OR	10M	TR	THR	1.5
13	ALDAN"S"-IAS58 CM73401-6Y-1Y-4M-1Y-1M-1Y-0M	----	SR	SR	10MR-R	SHR	1.8

Table 6. Continued

VTY NO.	VARIETY OR CROSS AND PEDIGREE	LOCATIONS					MEAN
		5	14	15	18	19	
28	PAN"S"-BUC"S" CH58797-4Y-1M-1Y-1M-4Y-OM	----	SR	10M	TR	TR	1.8
38	HON"S" X SIS"S"-CAN"S" CH62142-5Y-2M-1Y-1M-3Y-OM	----	OR	10M	TR	TMS	1.8
104	COCK-VEE"S" X DOVE"S"-VEE"S" CH69279-C-2Y-1M-2Y-1M-0Y	----	OR	10M	TR	TMS	1.8
17	CC-TDS(2) X MN72131 CH50308-5Y-3M-3Y-1Y-2M-0Y	----	SR	TR	10R-MR	10MR	2.0
38	TTR"S"-JUN"S" CH59123-3M-1Y-1M-4Y-1M-1Y-OM	----	OR	10M	TR	5MR	2.0
39	TTR"S"-JUN"S" CH59123-4M-1Y-1M-1Y-OM	----	OR	10MR	TR	5MS	2.0



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