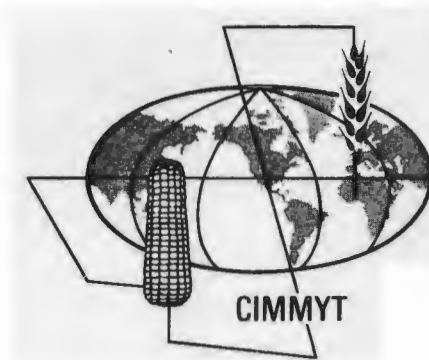


Instructions for the management of the

**INTERNATIONAL MAIZE ADAPTATION NURSERY
(IMAN)**



**CENTRO INTERNACIONAL DE MEJORAMIENTO DE MAIZ Y TRIGO
INTERNATIONAL MAIZE AND WHEAT IMPROVEMENT CENTER
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PLEASE RETURN THE RESULTS OF YOUR IMAN
AS SOON AS POSSIBLE AFTER HARVEST

Late returns lead to serious delays in publication of the results and reduce their value to maize workers throughout the world.

INTERNATIONAL MAIZE ADAPTATION NURSERY (IMAN)

INTRODUCTION

It has been known for a long time that varieties of maize differ greatly in their response to different environments. Many varieties are specifically adapted to a very narrow range of climatic or edaphic factors, while others are adapted to a much wider range of environmental factors. Unfortunately, little systematic information has been collected concerning this important aspect of maize breeding and production.

As part of the CIMMYT Maize Program the International Maize Adaptation Nursery (IMAN) has been designed to test initially the adaptation of maize varieties from many areas of the world over a wide range of latitudes, climates, fertility conditions, water management and disease and insect complexes. Not only will these trials serve as a source of fundamental information concerning the adaptability of maize, but also they will provide a means of testing promising material on a much broader basis than is usually available to an individual breeder; and serve as a source of new, valuable genetic material for use by the cooperator either directly or in crosses.

Because the first adaptation trials have been designed to assess the performance of maize varieties from widely different environmental and geographic situations, the performance of some of them is certain to be disappointing at particular test sites. However, the information gained from the trials will be invaluable as a guide to the breeders in their search for improved germ plasm.

The results of the International Maize Adaptation Nursery will be statistically analyzed and published for general distribution. It is important that cooperators study carefully the following pages which provide suggestions for the conduct of the nursery and the note-taking techniques. The value of these nurseries will depend to a large degree on the quality of the data which is returned for analysis.

It is understood that any country collaborating in these tests will be free to use any of the material included in the nursery, either as parental material or as commercial varieties. In this latter case, the source (i.e. country) of origin of the variety or line under multiplication should be recognized.

Experiment Plan

The International Maize Adaptation Nursery is made up of 49 test varieties plus a local check variety (see Local Check Variety below). There are two replicates of each variety.

The varieties (50 in all) are arranged in a randomized block design. The plot numbers are ordered sequentially in the first replicate, but the varieties have been assigned randomly. The plot numbers are randomized in replicate 2.

One envelope will contain seed for a single plot, Adequate seed of each variety is provided. The size and shape of the plot is left to the discretion of the individual cooperator. The size and shape of the plots should be noted on the general information sheet to be returned to CIMMYT. It is suggested that a double planting rate be used to allow for thinning following germination (emergence). It is suggested that the population in each plot be the equivalent of 43,500 plants/hectare.

As an aid to cooperators, the following experiment plan is proposed:

One packet of seed of each variety is provided for each replication. Two rows per plot could be seeded in 4.5 meter rows, with a between plant space of approximately 20 cm. It is acknowledged that row spacing will depend on available seeding equipment, however, a row spacing of 90 cm is suggested.

Selection of Varieties

An effort has been made to include varieties from a wide range of latitudes and altitudes, as well as a number of composite populations in order to sample a wide range of genetic material in a limited number of entries. Because of the wide variation in morphological and physiological responses that can be expected, the trial will be difficult to handle in some locations, but all the data thus obtained will be extremely valuable.

Local Check Variety

An empty envelope of entry number 50 is available for your local check variety. One envelope will become plot 50 and one plot 81. The variety must be placed in this order in the experiment prior to planting. The name of the local variety should be indicated in both the

collaborators' field book and in the copy returned to the coordinator. Please do not make any other variety substitutions, as this considerably complicates the statistical analysis.

Seed Treatment

All entries have been treated with an insecticide and a fungicide prior to shipment.

Planting Time

Please do not plant out of season. If the shipment arrives too late to plant in the regular season, hold the IMAN until the next regular season.

Fertilizer and Management

It is strongly urged that the nursery receive fertilizer and good management. This will allow the varieties to better express their potential.

It is essential that border rows are planted around the experimental area, if the results from the nursery are to be of any value. Seed of a local variety can be used for this purpose.

Protection from Birds and Animals

Differential varietal damage by birds or animals will nullify the value of any experiment. Therefore, each cooperator is urged to make certain that his experiment is protected from these pests. The method employed to minimize the effect of these factors is left entirely to the discretion of the collaborator.

Submitting Varieties for Test

Any scientists wishing to submit lines or varieties for inclusion in the forthcoming years' tests should have approximately 6 kilograms of seed shipped to:

Dr. Keith W. Finlay
Centro Internacional de Mejoramiento
de Maiz y Trigo
Londres 40
Mexico 6, D. F., Mexico

The package should be labelled "EXPERIMENTAL MAIZE SEED - NO COMMERCIAL VALUE". In all cases the shipment should be made via air express or air mail, and should reach Mexico City no later than the 1st of February of the year the test is to be made. It is not always possible to include all varieties submitted for trial. The final composition of the yield nursery will be made by CIMMYT.

SUGGESTED NOTES

General Instructions

Each collaborator will receive duplicate sets of forms for recording the characteristics set out in the following pages. These should both be completed as soon as the experiment is harvested. The collaborator may keep one set for his own personal use and the other should be returned by air mail to the coordinator (address on page 4).

The copy to be retained and the copy to be returned are clearly marked. The one to be returned is of lighter weight paper to save on air mail postage.

A form requesting general information about the experiment is attached to the front of the first data sheet. This provides space for listing latitude, longitude, elevation, planting date, rainfall, irrigation applied, fertilizer used etc. Please fill this out as completely as possible as the information is extremely useful in interpreting the results of the trial.

All notes should be taken for both replications of each variety if possible, and this will allow a more adequate statistical treatment of the data. Additional unlabelled columns are left in the data sheets for any other type of data. Collaborators are urged to include all additional data in which differential reactions are observed.

The metric system or percentage is preferred for recording data.

The following list of records is suggested as a guide to collaborators. Professional judgement by individual participants is urged.

Days to Flowering

A record of the number of days elapsed from planting (or first irrigation) to 50% silking will be most helpful in assessing variety adaptability. Subjective estimates of the range (e.g. ± 10) are invited, and when necessary note silking and tasseling when non-synchronous. Tables 1 and 1A are provided to assist in recording elapsed days. We suggest entering the planting day (or

effective planting day) on the general information sheet to be returned to CIMMYT. All other dates can then be entered as the accumulative days from January 1st. This, it is hoped, will simplify field data recording.

Number of Plants and Tillers

Please record the total number of plants per plot and the total number of tillers per plot. The above counts will be used to compute an index of tillering.

Ear Height

Estimate in centimeters, the distance from the soil line to the uppermost ear bearing node for each plot. If other units of measurement are used, PLEASE NOTE.

Root Lodging

Record the total number of plants per plot and the number of plants with an inclination of 30° or more from vertical. When appropriate, note the cause (e.g. high winds). Please record the date notes were taken.

Stalk Lodging

The total number of plants per plot and the number of stalks broken below the ear. When possible, note the cause (e.g. Diplodia sp.). Please record the date notes were taken.

An index of root and stalk lodging will be computed from the above data. If no lodging, enter "0".

Number of Plants Harvested

The total number of plants (including barren plants) and the number of plants harvested in each plot must be recorded (please do not include tillers in this count).

Number of Ears Harvested

Please record the total number of ears harvested and the number of rotten ears per plot. A subjective determination and evaluation of ear rot is invited.

Field Weight

The total weight of shucked ears per plot in kilograms is requested. If other units of measurement are used, PLEASE NOTE.

Per Cent Moisture

When possible, record at harvest the per cent moisture as a mean for each plot using one or more samples of grain drawn at random from each plot. Please indicate the Name and Model of machine used. If the necessary equipment is not available and it is possible, dry weights could be substituted.

Observations

Please note anything of interest to you such as "bad soil", "excellent", "too tall" etc.

A note describing in general the disease, insect and weather conditions of your site will be of interest and most helpful to all collaborators.

When scoring disease and/or insect incidence, please state the scale(s) and/or key(s) used.

Table 1. Dates and accumulative days from January 1 in a non-leap year.

DAYS FROM JANUARY 1											
Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1-1	1-32	1-60	1-91	1-121	1-152	1-182	1-213	1-244	1-274	1-305	1-335
2-2	2-33	2-61	2-92	2-122	2-153	2-183	2-214	2-245	2-275	2-306	2-336
3-3	3-34	3-62	3-93	3-123	3-154	3-184	3-215	3-246	3-276	3-307	3-337
4-4	4-35	4-63	4-94	4-124	4-155	4-185	4-216	4-247	4-277	4-308	4-338
5-5	5-36	5-64	5-95	5-125	5-156	5-186	5-217	5-248	5-278	5-309	5-339
6-6	6-37	6-65	6-96	6-126	6-157	6-187	6-218	6-249	6-279	6-310	6-340
7-7	7-38	7-66	7-97	7-127	7-158	7-188	7-219	7-250	7-280	7-311	7-341
8-8	8-39	8-67	8-98	8-128	8-159	8-189	8-220	8-251	8-281	8-312	8-342
9-9	9-40	9-68	9-99	9-129	9-160	9-190	9-221	9-252	9-282	9-313	9-343
10-10	10-41	10-69	10-100	10-130	10-161	10-191	10-222	10-253	10-283	10-314	10-344
11-11	11-42	11-70	11-101	11-131	11-162	11-192	11-223	11-254	11-284	11-315	11-345
12-12	12-43	12-71	12-102	12-132	12-163	12-193	12-224	12-255	12-285	12-316	12-346
13-13	13-44	13-72	13-103	13-133	13-164	13-194	13-225	13-256	13-286	13-317	13-347
14-14	14-45	14-73	14-104	14-134	14-165	14-195	14-226	14-257	14-287	14-318	14-348
15-15	15-46	15-74	15-105	15-135	15-166	15-196	15-227	15-258	15-288	15-319	15-349
16-16	16-47	16-75	16-106	16-136	16-167	16-197	16-228	16-259	16-289	16-320	16-350
17-17	17-48	17-76	17-107	17-137	17-168	17-198	17-229	17-260	17-290	17-321	17-351
18-18	18-49	18-77	18-108	18-138	18-169	18-199	18-230	18-261	18-291	18-322	18-352
19-19	19-50	19-78	19-109	19-139	19-170	19-200	19-231	19-262	19-292	19-323	19-353
20-20	20-51	20-79	20-110	20-140	20-171	20-201	20-232	20-263	20-293	20-324	20-354
21-21	21-52	21-80	21-111	21-141	21-172	21-202	21-233	21-264	21-294	21-325	21-355
22-22	22-53	22-81	22-112	22-142	22-173	22-203	22-234	22-265	22-295	22-326	22-356
23-23	23-54	23-82	23-113	23-143	23-174	23-204	23-235	23-266	23-296	23-327	23-357
24-24	24-55	24-83	24-114	24-144	24-175	24-205	24-236	24-267	24-297	24-328	24-358
25-25	25-56	25-84	25-115	25-145	25-176	25-206	25-237	25-268	25-298	25-329	25-359
26-26	26-57	26-85	26-116	26-146	26-177	26-207	26-238	26-269	26-299	26-330	26-360
27-27	27-58	27-86	27-117	27-147	27-178	27-208	27-239	27-270	27-300	27-331	27-361
28-28	28-59	28-87	28-118	28-148	28-179	28-209	28-240	28-271	28-301	28-332	28-362
29-29		29-88	29-119	29-149	29-180	29-210	29-241	29-272	29-302	29-333	29-363
30-30		30-89	30-120	30-150	30-181	30-211	30-242	30-273	30-303	30-334	30-364
31-31		31-90		31-151		31-212	31-243		31-304		31-365

Table 1A. Dates and accumulative days from January 1 in a leap year.

DAYS FROM JANUARY 1											
Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1-1	1-32	1-61	1-92	1-122	1-153	1-183	1-214	1-245	1-275	1-306	1-336
2-2	2-33	2-62	2-93	2-123	2-154	2-184	2-215	2-246	2-276	2-307	2-337
3-3	3-34	3-63	3-94	3-124	3-155	3-185	3-216	3-247	3-277	3-308	3-338
4-4	4-35	4-64	4-95	4-125	4-156	4-186	4-217	4-248	4-278	4-309	4-339
5-5	5-36	5-65	5-96	5-126	5-157	5-187	5-218	5-249	5-279	5-310	5-340
6-6	6-37	6-66	6-97	6-127	6-158	6-188	6-219	6-250	6-280	6-311	6-341
7-7	7-38	7-67	7-98	7-128	7-159	7-189	7-220	7-251	7-281	7-312	7-342
8-8	8-39	8-68	8-99	8-129	8-160	8-190	8-221	8-252	8-282	8-313	8-343
9-9	9-40	9-69	9-100	9-130	9-161	9-191	9-222	9-253	9-283	9-314	9-344
10-10	10-41	10-70	10-101	10-131	10-162	10-192	10-223	10-254	10-284	10-315	10-345
11-11	11-42	11-71	11-102	11-132	11-163	11-193	11-224	11-255	11-285	11-316	11-346
12-12	12-43	12-72	12-103	12-133	12-164	12-194	12-225	12-256	12-286	12-317	12-347
13-13	13-44	13-73	13-104	13-134	13-165	13-195	13-226	13-257	13-287	13-318	13-348
14-14	14-45	14-74	14-105	14-135	14-166	14-196	14-227	14-258	14-288	14-319	14-349
15-15	15-46	15-75	15-106	15-136	15-167	15-197	15-228	15-259	15-289	15-320	15-350
16-16	16-47	16-76	16-107	16-137	16-168	16-198	16-229	16-260	16-290	16-321	16-351
17-17	17-48	17-77	17-108	17-138	17-169	17-199	17-230	17-261	17-291	17-322	17-352
18-18	18-49	18-78	18-109	18-139	18-170	18-200	18-231	18-262	18-292	18-323	18-353
19-19	19-50	19-79	19-110	19-140	19-171	19-201	19-232	19-263	19-293	19-324	19-354
20-20	20-51	20-80	20-111	20-141	20-172	20-202	20-233	20-264	20-294	20-325	20-355
21-21	21-52	21-81	21-112	21-142	21-173	21-203	21-234	21-265	21-295	21-326	21-356
22-22	22-53	22-82	22-113	22-143	22-174	22-204	22-235	22-266	22-296	22-327	22-357
23-23	23-54	23-83	23-114	23-144	23-175	23-205	23-236	23-267	23-297	23-328	23-358
24-24	24-55	24-84	24-115	24-145	24-176	24-206	24-237	24-268	24-298	24-329	24-359
25-25	25-56	25-85	25-116	25-146	25-177	25-207	25-238	25-269	25-299	25-330	25-360
26-26	26-57	26-86	26-117	26-147	26-178	26-208	26-239	26-270	26-300	26-331	26-361
27-27	27-58	27-87	27-118	27-148	27-179	27-209	27-240	27-271	27-301	27-332	27-362
28-28	28-59	28-88	28-119	28-149	28-180	28-210	28-241	28-272	28-302	28-333	28-363
29-29	29-60	29-89	29-120	29-150	29-181	29-211	29-242	29-273	29-303	29-334	29-364
30-30		30-90	30-121	30-151	30-182	30-212	30-243	30-274	30-304	30-335	30-365
31-31		31-91		31-152		31-213	31-244		31-305		31-366

