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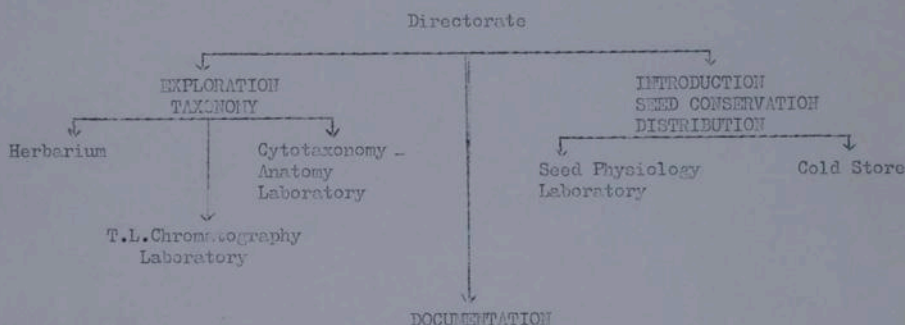
About the Institute

The Hunt Institute for Botanical Documentation, a research division of Carnegie Mellon University, specializes in the history of botany and all aspects of plant science and serves the international scientific community through research and documentation. To this end, the Institute acquires and maintains authoritative collections of books, plant images, manuscripts, portraits and data files, and provides publications and other modes of information service. The Institute meets the reference needs of botanists, biologists, historians, conservationists, librarians, bibliographers and the public at large, especially those concerned with any aspect of the North American flora.

Hunt Institute was dedicated in 1961 as the Rachel McMasters Miller Hunt Botanical Library, an international center for bibliographical research and service in the interests of botany and horticulture, as well as a center for the study of all aspects of the history of the plant sciences. By 1971 the Library's activities had so diversified that the name was changed to Hunt Institute for Botanical Documentation. Growth in collections and research projects led to the establishment of four programmatic departments: Archives, Art, Bibliography and the Library.

REPUBLIC OF TURKEY
 MINISTRY OF FOOD, AGRICULTURE AND ANIMAL HUSBANDRY
 AEGEAN REGIONAL AGRICULTURAL RESEARCH INSTITUTE
 Menemen-Izmir
 PLANT GENETIC RESOURCES SECTION

ORGANIZATION



PERSONNEL

Exploration, Taxonomy : H.A.Sencer, M.Sc.
 3 technicians

Documentation : H.Settar, B.Sc.
 2 technicians

Int., Seed Con., Distribution : K.Alpman, M.Sc.
 3 technicians

EXPLORATION

Exploration activities started as early as 1964. In 1964 and 1965 chiefly wheat collections were made in the Aegean region, for wheat breeding programmes. 1966 and 1967 can be considered a transitional period, during which various techniques of collecting, sampling, recording, etc. were tried and experience gained. Systematic and intensive exploration activities started in 1968, as a result of a number of improved foreign varieties being introduced, including Mexican wheat varieties.

Exploration activities were interrupted in 1969 due to the termination of joint Turkish Government / United Nations Special Fund project during the collecting season but with the subsequent extensions of the same project, exploration activities conti-

nued during the period 1970-1973.

Number of original collections made in Turkey and received from other institutions in Turkey and other countries, during 1964-1973 are shown in Table 1. Number of major seed collections made in Turkey, by the "Plant Genetic Resources Section", in 1966-1973 are shown in Table 2.

During the period of 1966-1973, as a total of 24 persons (13 Turkish citizen) participated in exploration activities mainly for the purpose of field training. Cooperation was made with 19 visiting collectors, from seven different countries (for exploration) during 1964-1973.

Special methods and techniques, developed according to theoretical considerations and experience gained, were applied for planning and execution of exploration activities. Seed collections made were transferred to cold store and herbarium samples to herbarium.

The field records were entered on the standard forms, to enable the transfer of data on to hand sorted punch-cards, during 1966-1970 (Form 1). Serious attempts were made as of 1970 for the development of a format which would enable the transfer of data to computer. In 1973 a free-field format was prepared for this purpose (Form 2). Information available for original collections, received from other institutions, were also entered on the same form. Exploration and identification data were transferred to documentation.

The coordination of evaluation studies on the original collections were aimed at from the beginning. Table 3 shows where and for what purpose(s) the major collections have been or are being evaluated.

TAXONOMY

Parallel to seed and other collections made during exploration activities, herbarium samples were also taken to enable taxonomic identification and/or to show the phenotypic variation existing in the collections. Table 4 shows the existing herbarium samples. These were identified as to family, genus, species, etc. each year and placed in herbarium cabinets in alphabetical sequence of families, genera, species, etc.

Maps showing the collection sites, as well as distribution of various crop collections were prepared.

The thin-layer chromatography and cytotaxonomy-anatomy laboratories were established to enable taxonomic studies where morphology would prove to be insufficient.

A research programme on "Variation in Genus Sacale L.-rye" with regards to morphological characters and leaf-phenolic compounds is being carried out. A computer format has been prepared to enable computer processing of data.

DOCUMENTATION

Data related to germ plasm material can be classified as follows :

1. COLLECTION DATA
2. IDENTIFICATION DATA
3. STORAGE DATA
4. DISTRIBUTION DATA
5. EVALUATION DATA
6. REJUVENATION DATA

Computer facilities are used for the documentation of germplasm material. All information, coming on certain forms, are punched on IBM cards and processed according to TAXIR, which is a special program, developed by Prof. D.J.Rogers, for processing of biological data.

Punching is checked through check-lists. After corrections, the data are processed and the cards retained.

Following data banks are/will be established for different kinds of data :

1. COLLECTION DATA BANK
2. IDENTIFICATION DATA BANK
3. STORAGE DATA BANK
4. DISTRIBUTION DATA BANK
5. EVALUATION DATA BANK
6. REJUVENATION DATA BANK

Present Activities :

- 1- Descriptor Lists for "Collection Record" and "Storage Record" prepared.
- 2- Collection and identification data of 1972, 1973 (including Iranian collection) have been key-punched.
- 3- Check lists prepared.

INTRODUCTION

After approval of the Institute Director, requests for introduction of planting material have been procured. Several requests have been received from Institutions in Turkey, in addition to the ones coming from our institute.

The procedure applied for introduction is as follows:

1. Material is requested from supplier by the directorate,
2. Import permit for requested material is obtained from the "Ministry of Food-Agriculture and Animal Husbandry,
3. Requested material received through "Plant Quarantine Directorate-Izmir" after the validity of its phytosanitary certificate has been determined and material inspected,
4. Material is sent to the requesting institution, following the registration of it by documentation (Often subsamples of supplied material are being prepared for purpose of storage),
5. The supplier is informed about receipt of the material.

As shown in Table 1, more than 22.000 samples have been introduced so far.

DISTRIBUTION

The procedure followed for distribution of the material from cold storage is as follows :

1. Approval of the request by the Institute Director,
2. Lists of requested material prepared by documentation,
3. Material repared for distribution,
4. If the material is being sent to abroad, phytosanitary certificate issued by "Plant Quarantine Directorate-Izmir",
5. Material is mailed (by air) to the requesting institution.

As shown in Table 5, more than 22000 samples have been distributed, of which 7370 to abroad, 14437 in Turkey. In addition, a service work was done for plant breeders for the exchange of breeding lines.

When material is being prepared, due consideration of seed viability and available amount is made. Often, the recipient is asked to increase certain accessions and send the harvest back to the institute. This cooperation is well established with several institutes.

Recipients are always asked to supply the results of their studies on the material they received from the institute. Results have started to arrive.

SEED CONSERVATION

Seed collections, coming to the cold store are:

1. Original collections, from Turkey and other countries,
2. Improved varieties, from Turkey and other countries.

Seed collections, entering cold store, go through the following procedure:

1. Viability of the collections are checked following the rules of ISTA (International Seed Testing Association). Viability tests are repeated periodically.
2. Drying of samples is done in the drying room where hundreds of samples can be dried simultaneously. The air humidity of the room is absorbed by a dehumidifier. The seed moisture is determined by means of different methods. When seed moisture has decreased to desirable level, the samples are transferred into moisture proof containers.
3. Storage. The seed containers are placed in cold rooms where the temperature is $\pm 0^{\circ}\text{C}$. In cold storage rooms, the collections of each year are arranged in alphabetical sequence of families, genera and species. Each sample is divided to 2-3 parts (base, active and excess- if sufficient material is available) and kept separately.

Storage data have been recorded on standard forms (Form 3). Information related to viability quantity, physical location, etc. of each sample will be recorded on free formats (Form 4).

Basic research, to find out optimum storage conditions for various species, is one of the inevitable duties in "Plant Genetic Resources" activities, since there are several species dealt with and for many of them no such data available.

TABLE 1

COLLECTIONS

Origin	Type of Coll.	1964-1965	1966	1967	1968	1969	1970	1971	1972	1973	Total
Turkey	C(V)	88	9	583	68	6	23	-	-	-	777
Turkey	C(V), (S)	-	-	526	627	283	823	-	-	-	2259
Turkey	C(S)	446	2177	3064	73	56	3	1018	1924	1573	10334
Turkey	1C(V)	-	-	15	17	-	-	-	-	-	32
Turkey	1C(S)	672	60	202	134	53	-	5	89	400	1615
Iran	1C(S)	91	-	-	-	-	-	-	-	1*525	616
Ethiopia	1C(S)	54	-	-	-	15	-	-	-	-	69
Austria	1C(S)	154	-	-	-	-	-	-	-	-	154
Tenerife	1C(S)	15	-	-	-	-	-	-	-	-	15
Nepal	1C(S)	-	-	-	-	-	-	-	140	-	140
Turkey	11, 1C(S)	678	20	649	-	241	-	-	42	100	1730
Various	11(V)	-	-	95	59	17	8	-	3	-	182
Various	11(S)	276	1656	13935	1354	2800	406	28	745	519 ₂	21719
-	-	24	13	9	-	-	-	1	339	-	386
TOTAL		2498	3935	19078	2332	3471	1263	1052	3282	3117	40031

C : original collections done in Turkey, by the institute.

1C : " " introduced from other institutions.

11 : introduced-improved collections.

- : collections of uncertain origin and type.

S : seed collection.

V : vegetative collections.

Total number of C 13370

" " " 1C(origin: Turkey) 1647

" " " 1C(origin: other countries) 994

" " " 11 21901

" " " - 386

1* : assigned Iranian accession numbers.

2* : accession numbers were not assigned.

TABLE 2

MAJOR SEED COLLECTIONS MADE IN TURKEY

1966-1973

Group	1966	1967	1968	1969	1970	1971	1972	1973	Total
Cereals	113	263	405	-	545	361	229	711	2627
Grain Legumes	55	131	138	55	82	438	126	430	1455
Forage Legumes	954	1092	46	18	64	91	20	19	2304
Forage Grasses	497	382	1	-	8	3	1	-	892
Vegetables-Spices	72	59	31	31	49	73	86	274	675
Industrial Crops	5	10	3	7	12	9	1409	58	1513
	1696	1937	624	111	760	975	1871	1492	9466

TABLE 3

EVALUATION STUDIES IN PROGRESS ON THE COLLECTIONS

Material and Recipient Country	Year of Despatch	Purpose of Research
<u>Triticum monococcum</u> L. (Wild, cult.)		
Netherlands (Wageningen)	1968	Search for sources of stripe rust (<u>Puccinia striiformis</u>) resistance. (Promising results obtained)
U.S.A. (Corvallis-Oregon)	1972	ditto
U.S.A. (California)	1972	Identification of amino acids and proteins
Sweden (Svalöv)	1973	Determination of protein and lysine content.
<u>Triticum turgidum</u> L. emend. Bowden Gr. <u>durum</u>		
Canada (Winnipeg)	1970	Search for sources of disease resistance
Sweden (Svalöv)	1966	Search for sources of mildew resistance
Israel	1974	Search for sources of <u>Septoria</u> resistance
Turkey (Ankara-ITTC)	1974	Search for sources of winter hardiness
Turkey (Izmir)	1974	Search for sources of <u>Septoria</u> resistance
Turkey (Izmir)	1971	Search for sources of <u>Puccinia graminis</u> , <u>Puccinia recondita</u> and <u>Puccinia striiformis</u> resistance (Promising results obtained)
Australia	1974	Not defined
<u>Triticum aestivum</u> L. emend. Bowden		
Canada (Winnipeg)	1970	Search for sources of disease resistance
Turkey (Izmir)	1971	Search for sources of <u>Puccinia graminis</u> , <u>Puccinia recondita</u> and <u>Puccinia striiformis</u> resistance (Promising results obtained)
Sweden (Svalöv)	1973	Determination of protein and lysine content (Results available)
Israel	1974	Search for sources of <u>Septoria</u> resistance
Turkey (Izmir)	1974	Search for sources of <u>Septoria</u> resistance
Australia	1974	Not defined

Material and Recipient Country	Year of Despatch	Purpose of Research
<u>Hordeum vulgare</u> L. emend Bowden Gr. <u>vulgare</u>		
" " " " " " <u>distichon</u>		
Canada (Winnipeg)	1970	Search for sources of disease resistance
Sweden (Svalöv)	1973	Search for sources of mildew resistance
Turkey (Izmir)	1974	Search for sources of <u>Ustilago</u> , <u>Helminthosporium</u> , <u>Erisiphe</u> and <u>Septoria</u> .
Turkey (Ankara-ÜTTC)	1974	Search for sources of winter hardiness
<u>Hordeum</u> spp. (wild)		
Canada (Winnipeg)	1970	Search for sources of disease resistance
<u>Avena byzantina</u> C. Koch		
" <u>sativa</u> L.		
" spp. (wild)		
Canada (Winnipeg)	1970	Search for sources of stem-rust and crown rust resistance and determination of oil and protein content.
<u>Secale cereale</u> L.		
Germany (Braunschweig)	1972	Breeding of rye varieties
Mexico (CIMMYT)	1970	To obtain <u>Triticale</u>
Turkey (Izmir)	1972	Taxonomic studies in genus <u>Secale</u>
<u>Cicer arietinum</u> L.		
Spain	1969	Cytogenetical and morphological studies
Netherlands	1971	Taxonomic studies
Turkey (Izmir)	1971	Taxonomic studies
Lebanon	1972	Variety improvement for arid lands
Iraq	1972	Breeding for high yielding varieties
Australia	1973	Search for sources of protein
Israel	1973	Search for <u>Ascochita</u> blight resistance and large seeded types.
Turkey (Eskişehir)	1973	Breeding for high yielding varieties
<u>Lens culinaris</u> Medik		
Spain	1969	Cytogenetical and morphological studies
Argentina	1972	Search for sources of resistance to <u>Fusarium oxysporium</u> Schl.

Material and Recipient Country	Year of Despatch	Purpose of Research
Iraq	1972	Breeding for high yielding varieties
Lebanon	1972	Variety improvement for arid lands
Turkey (Eskişehir)	1973	Breeding for high yielding varieties
<u>Phaseolus vulgaris</u> L.		
Iraq	1972	Breeding for high yielding varieties
Turkey (Eskişehir)	1973	Breeding for high yielding varieties
<u>Vicia faba</u> L.		
Sweden (Svalöv)	1969	Search for earliness
Germany	1971	Genetical studies
Lebanon	1972	Variety improvement for arid lands
Australia	1973	Search for sources of protein
Turkey (Izmir)	1973	Breeding for high yielding varieties
<u>Citrullus vulgaris</u> Forsk., <u>Cucumis sativus</u> L., <u>Cucumis melo</u> L.		
Israel	1973	Search for sources of <u>Verticillium</u> and <u>Fusarium</u> resistance
<u>Lactuca sativa</u> L.		
Israel	1973	Search for sources of resistance to <u>Peronospora</u> , <u>Stemphylium</u> and LMV
<u>Solanum melongena</u> L.		
Israel	1973	Sources of <u>Verticillium</u> resistance
<u>Capsicum annuum</u> L.		
Israel	1973	Search for sources of resistance to CMV and breeding of hot and sweet cultivars.
<u>Vicia sativa</u> L. <u>Vicia pannonica</u> Crantz <u>Vicia villosa</u> Roth <u>Vicia dasycarpa</u> Ten.		
Turkey (Izmir)	1968	Breeding of annual vetch varieties with high dry matter in hay and suitable for rotation with cotton in Aegean Region. (4 new varieties will be released during 1974, selected from the Centre's own collections).

<u>Material and Recipient Country</u>	<u>Year of Despatch</u>	<u>Purpose of Research</u>
<u>Phalaris</u> spp.		
<u>Lolium</u> spp.		
<u>Dactylis</u> spp.		
<u>Bromus</u> spp.		
<u>Arrhenatherum</u> spp.		
<u>Pestuca</u> spp.		
Turkey (Izmir)	1968	Variety improvement for dry and irrigated land in Aegean Region. (The Centre's own collections are being evaluated for characters such as winter hardiness, drought resistance and other morphological and biological attributes).

TABLE 4

HERBARIUM SAMPLES

I. Main Herbarium

1. Voucher Specimens

<u>Family</u>	<u>Number of Specimens</u>
<u>Fabaceae</u>	1802
<u>Gramineae</u>	3200
Other	1510
Non-identified	145
Coll. in 1964-1965	228

2. Voucher Specimens Sent From Other Institutions

from Turkey	250
from other countries	280

II. Seed and Pod Herbarium Samples

<u>Fabaceae</u>	1725
Total	9140

111. Dr. M.Gökçöl's Herbarium

<u>Family</u>	<u>Number of Specimens</u>
<u>Gramineae</u>	23000 ... (spikes)

Total number of families : 71

Largest families : Fabaceae, Gramineae, Liliaceae, Rosaceae.

Largest genera : Triticum L., Hordeum L., Secale L., Avena L., Lolium L., Trifolium L.,
Medicago L., Vicia L., Phaseolus L.

TABLE 5

DISTRIBUTED SAMPLES

<u>Year</u>	<u>Turkey</u>	<u>Abroad</u>	<u>Turkey, Abroad</u>	<u>Total</u>
1965				
1966				
1967	2975	160	95	3230
1968	214	2624	376	3214
1969	1473	265	-	1738
1970	3668	195	-	3863
1971	3474	1672	-	5146
1972	2186	976	-	3062
1973	447	1578	-	2025
Total	14437	7370	471	22278

SITE CARD

Site Identification :

Observer : Date : Site No. km.:

Elevation : Aspect : Lat : Long :

Vegetation / Association Type :

Disturbance Factors :

Soil : Light, heavy/calcareous, acidic, saline/deep, shallow/grey, brown, red/stony

Other information :

Collection :

Species Name	Accession No.	No.	H S V	Associated Species Cultivated
		1		
		2		
		3		
		4		
		5		
		6		
		7		
		8		
		9		
		10		Wild
		11		
		12		
		13		
		14		
		15		
		16		
		17		
		18		
		19		
		20		
		21		
		22		
		23		
		24		
		25		
		26		
		27		

PLANT GENETIC RESOURCES CENTRE
İZMİR — TURKEY

COLLECTION RECORD

ACCESSION NUMBER

COLLECTION NUMBER

COLLECTOR (S)

LOCALITY

COUNTRY

PROVINCE

PRECISE LOCALITY

ALTITUDE

ASPECT

LATITUDE

LONGITUDE

IDENTIFICATION

FAMILY

GENUS

SP.

SSP.

VAR. OR GROUP

LOCAL NAME

NATURE OF COLLECTION

SAMPLE

KIND OF HER.

COMPOSITION OF COLL.

PHOTOGRAPH

1. SEED B-POP

SPECIMENS

1. SINGLE SPECIES

1. HAB. COL.

2. SEED N-POP

1. ROOT

2. MIXED COLLECTION

2. HAB. B.W.

3. SEED U-POP

2. STEM

3. CLOSE-UP COL.

4. POLLEN B-POP

3. LEAF

4. CLOSE-UP B.W.

5. POLLEN N-POP

4. FLOWER

ORIGIN OF HERBARIUM

6. POLLEN U-POP

5. FRUIT

SPECIMENS

7. VEG. B-POP

6. SEED

1. ORIGINAL

8. VEG. N-POP

7. ALL

2. CULTI

9. VEG. U-POP

8. PRESENT

HABITAT OR SOURCE

PRIMARY HABITAT

SECONDARY HABITAT

OTHER SOURCE

1. BROADLEAF EVERGREEN

1. CULTIVATED LAND

1. MARKET

2. BROADLEAF DECIDUOUS

2. FIELD BORDER

2. FARM STORAGE

3. NEEDLELEAF EVERGREEN

3. ROADSIDE

3. EX. STATION

4. NEEDLELEAF DECIDUOUS

4. WASTE

4. THRESHING PLACE

5. MIXED FOREST

5. O., SPECIFY

5. O., SPECIFY

6. GRASS

7. HERB. PLS. OTHER THAN GR.

8. O., SPECIFY

ADDITIONAL DATA

DISTURBANCE FACTORS

1. WIND EROSION
2. WATER EROSION
3. FLOODING
4. DRAINAGE
5. IRRIGATION
6. FIRE
7. GRAZING
8. CUTTING
9. CULTIVATION
10. O., SPECIFY

TOPOGRAPHY**PHYSIOGRAPHY**

1. SLOPE
2. VALLEY
3. PLAIN
4. PLATEAU
5. SUMMIT
6. O., SPECIFY

LAND FORM

1. FLAT
2. HILLY
3. MOUNTAINOUS
4. O., SPECIFY

SOIL**SOIL CLASS**

1. GRAVEL
2. SAND
3. SANDY LOAM
4. LOAM
5. LOAMY SILT
6. SILT
7. SILTY CLAY
8. CLAY
9. ORGANIC

SOIL DRAINAGE

1. POOR
2. MODERATE
3. WELL DRAINED
4. EXCESSIVELY DRAINED

SOIL STONINESS

1. FEW
2. STONY
3. VERY STONY
4. ESSENTIALLY PAVED

SOIL pH

1. VERY LOW (<4.0)
2. LOW (4.0-5.5)
3. MEDIUM (5.5-7.5)
4. HIGH (7.5-9.0)
5. VERY HIGH (>9.0)

SOIL COLOUR**INTENSITY**

1. LIGHT
2. MEDIUM
3. DARK

COMPOSITION

1. YELLOW
2. ORANGE
3. RED
4. BROWN
5. BLACK
6. GREY
7. OLIVE
8. BLUE
9. O., SPECIFY

SOIL SALINITY

1. NONE
2. LOW
3. MEDIUM
4. HIGH

ASSOCIATED WILD SPECIES OR CROPS**GENUS****SPECIES**

ROOM NO. _____

RACK NO.

TRAY NO.

GENUS + SPECIES :

VARIETY :

CRIC NO.

ORIGIN :

DATE _____

GRAM
NCOMINGGRAM
GOING

BALENC
GR.

GERMIN
Year

Percent

COL. NO.

REMARKS

NEAR EAST GENETIC RESOURCES CENTRE
IZMİR — TURKEY

STOCK RECORD

① SERIAL NUMBER
② ACCESSION NUMBER

IDENTIFICATION

③ FAMILY
④ GENUS ⑤ SP
⑥ SSP ⑦ VAR. OR GROUP

⑧ ORIGIN OF COLLECTIONS
1. ORIGINAL 2. REJUVENATED

⑨ PRESERVATION IN STORAGE
SEED MOISTURE ⑩ DET. DATE OF SM

GERMINATION %	DATE OF GERM. TEST	GERMINATION %	DATE OF GERM. TEST
11	12	13	14
15	16	17	18
19	20	21	22
23	24	25	26
27	28	29	30

PHYSICAL LOCATION OF BASE COLLECTION

ROOM NUMBER	BLOCK NUMBER	SEGMENT NUMBER	ROW NUMBER	BOX NUMBER
31	32	33	34	35
				36

DESPATCH FROM BASE COLLECTION

DESPATCH NUMBER	DATE	I QUANTITY (GRAM)	QUANTITY (GRAM)	BALANCE (GRAM)
38	39	40	41	42
42	43	44	45	46
46	47	48	49	50
50	51	52	53	54
54	55	56	57	

PHYSICAL LOCATION OF EXCESS COLLECTION

ROOM NUMBER	BLOCK NUMBER	SEGMENT NUMBER	ROW NUMBER	BOX NUMBER
58	59	60	61	62
				63

DESPATCH FORM EXCESS COLLECTION

DESPATCH NUMBER	DATE	I QUANTITY (GRAM)	QUANTITY (GRAM)	BALANCE (GRAM)
65	66	67	68	69
69	70	71	72	73
73	74	75	76	77
77	78	79	80	81
81	82	83	84	

DESPATCH FROM COUNTRY ACTIVE COLLECTION

DESPATCH NUMBER	DATE	I QUANTITY (GRAM) QUANTITY (GRAM)	BALANCE (GRAM)
86	87	83	89
90	91	92	93
94	95	96	97
98	99	100	101
102	103	104	105
106	107	108	109
110	111	112	113
114	115	116	117
118	119	120	121
122	123	124	125

PHYSICAL LOCATION OF ACTIVE COLLECTION

ROOM NUMBER	BLOCK NUMBER	SEGMENT NUMBER	ROW NUMBER	BOX NUMBER
126	127	128 129	130	131

DESPATCH FROM ACTIVE COLLECTION

DESPATCH NUMBER	DATE	I QUANTITY (GRAM) QUANTITY (GRAM)	BALANCE (GRAM)
133	134	135	136
137	138	139	140
141	142	143	144
145	146	147	148
149	150	151	152
153	154	155	156
157	158	159	160
161	162	163	164
165	166	167	168
169	170	171	172
173	174	175	176
177	178	179	180
181	182	183	184
185	186	187	188
189	190	191	192
193	194	195	196
197	198	199	200
201	202	203	204
205	206	207	208
209	210	211	212
213	214	215	216
217	218	219	220
221	222	223	224
225	226	227	228
229	230	231	232

DESCRIPTORS AND DESCRIPTOR STATES
OF STORAGE RECORDS

1. SERIAL NUMBER
2. ACCESSION NUMBER
3. FAMILY
4. GENUS
5. SPECIES
6. SSP.
7. VAR. OR. GROUP
8. ORIGIN OF COLLECTIONS
 1. ORIGINAL
 2. REJUVENATED
9. SEED MOISTURE
10. DETERMINATION DATE OF SEED MOISTURE
11. GERMINATION %
12. DATE OF GERMINATION TEST
13. GERMINATION %
14. DATE OF GERMINATION TEST
15. GERMINATION %
16. DATE OF GERMINATION TEST
17. GERMINATION %
18. DATE OF GERMINATION TEST
19. GERMINATION %
20. DATE OF GERMINATION TEST
21. GERMINATION %
22. DATE OF GERMINATION TEST
23. GERMINATION %
24. DATE OF GERMINATION TEST
25. GERMINATION %
26. DATE OF GERMINATION TEST
27. GERMINATION %

28. DATE OF GERMINATION TEST
29. GERMINATION %
30. DATE OF GERMINATION TEST
31. ROOM NUMBER
32. BLOCK NUMBER
33. SEGMENT NUMBER
34. DRAWER NUMBER
35. ROW NUMBER
36. BOX NUMBER
37. QUANTITY (GRAM)
38. DESPATCH NUMBER
39. DESPATCH DATE
40. QUANTITY (GRAM)
41. BALANCE (GRAM)
42. DESPATCH NUMBER
43. DESPATCH DATE
44. QUANTITY (GRAM)
45. BALANCE (GRAM)
46. DESPATCH NUMBER
47. DESPATCH DATE
48. QUANTITY (GRAM)
49. BALANCE (GRAM)
50. DESPATCH NUMBER
51. DESPATCH DATE
52. QUANTITY (GRAM)
53. BALANCE (GRAM)
54. DESPATCH NUMBER
55. DESPATCH DATE
56. QUANTITY (GRAM)
57. BALANCE (GRAM)
58. EXCESS STORAGE ROOM NUMBER

59. EXCESS STORAGE BLOCK NUMBER
60. EXCESS STORAGE SEGMENT NUMBER
61. EXCESS STORAGE DRAWER NUMBER
62. EXCESS STORAGE ROW NUMBER
63. EXCESS STORAGE BOX NUMBER
64. QUANTITY (GRAM)
65. DESPATCH NUMBER
66. DESPATCH DATE
67. QUANTITY (GRAM)
68. BALANCE (GRAM)
69. DESPATCH NUMBER
70. DESPATCH DATE
71. QUANTITY (GRAM)
72. BALANCE (GRAM)
73. DESPATCH NUMBER
74. DESPATCH DATE
75. QUANTITY (GRAM)
76. BALANCE (GRAM)
77. DESPATCH NUMBER
78. DESPATCH DATE
79. QUANTITY (GRAM)
80. BALANCE (GRAM)
81. DESPATCH NUMBER
82. DESPATCH DATE
83. QUANTITY (GRAM)
84. BALANCE (GRAM)
85. QUANTITY (GRAM)
86. DESPATCH NUMBER
87. DESPATCH DATE
88. QUANTITY (GRAM)

89. BALANCE (GRAM)
90. DESPATCH NUMBER
91. DESPATCH DATE
92. QUANTITY (GRAM)
93. BALANCE (GRAM)
94. DESPATCH NUMBER
95. DESPATCH DATE
96. QUANTITY (GRAM)
97. BALANCE (GRAM)
98. DESPATCH NUMBER
99. DESPATCH DATE
100. QUANTITY (GRAM)
101. BALANCE (GRAM)
102. DESPATCH NUMBER
103. DESPATCH DATE
104. QUANTITY (GRAM)
105. BALANCE (GRAM)
106. DESPATCH NUMBER
107. DESPATCH DATE
108. QUANTITY (GRAM)
109. BALANCE (GRAM)
110. DESPATCH NUMBER
111. DESPATCH DATE
112. QUANTITY (GRAM)
113. BALANCE (GRAM)
114. DESPATCH NUMBER
115. DESPATCH DATE
116. QUANTITY (GRAM)
117. BALANCE (GRAM)
118. DESPATCH NUMBER

119. DESPATCH DATE
120. QUANTITY (GRAM)
121. BALANCE (GRAM)
122. DESPATCH NUMBER
123. DESPATCH DATE
124. QUANTITY (GRAM)
125. BALANCE (GRAM)
126. ACTIVE COL. ROOM NUMBER
127. ACTIVE COL. BLOCK NUMBER
128. ACTIVE COL. SEGMENT NUMBER
129. ACTIVE COL. DRAWER NUMBER
130. ACTIVE COL. ROW NUMBER
131. ACTIVE COL. BOX NUMBER
132. QUANTITY (GRAM)
133. DESPATCH NUMBER
134. DESPATCH DATE
135. QUANTITY (GRAM)
136. BALANCE (GRAM)
137. DESPATCH NUMBER
138. DESPATCH DATE
139. QUANTITY (GRAM)
140. BALANCE (GRAM)
141. DESPATCH NUMBER
142. DESPATCH DATE
143. QUANTITY (GRAM)
144. BALANCE (GRAM)
145. DESPATCH NUMBER
146. DESPATCH DATE
147. QUANTITY (GRAM)
148. BALANCE (GRAM)
149. DESPATCH NUMBER

150. DESPATCH DATE

151. QUANTITY (GRAM)

152. BALANCE (GRAM)

This is not correct

PLANT GENETIC RESOURCES CENTRE
IZMİR — TURKEY

COLLECTION RECORD

① ACCESSION NUMBER
② COLLECTOR (S)
③ COLLECTION NUMBER
④
⑤
⑥
⑦
⑧
⑨ COUNTRY
⑩ PROVINCE
⑪
⑫ PRECISE LOCALITY

⑬ ALTITUDE
⑭ ASPECT
⑮ LATITUDE
⑯ LONGITUDE

IDENTIFICATION
⑰ FAMILY
⑱ GENUS
⑲ SP.
⑳ SSP.
㉑ VAR. OR GROUP
㉒ LOCAL NAME

NATURE OF COLLECTION
㉓ SAMPLE
1. SEED B-POP
2. SEED N-POP
3. SEED U-POP
4. POLLEN B-POP
5. POLLEN N-POP
6. POLLEN U-POP
7. VEG. B-POP
8. VEG. N-POP
9. VEG. U-POP
㉔ KIND OF HER. SPECIMENS
1. ROOT
2. STEM
3. LEAF
4. FLOWER
5. FRUIT
6. SEED
7. ALL
8. PRESENT
㉕ COMPOSITION OF COLL.
1. SINGLE SPECIES
2. MIXED COLLECTION
㉖ ORIGIN OF HERBARIUM SPECIMENS
1. ORIGINAL
2. CULTI
㉗ PHOTOGRAPH
1. HAB. COL.
2. HAB. B.W.
3. CLOSE-UP COL.
4. CLOSE-UP B.W.

HABITAT OR SOURCE
㉘ PRIMARY HABITAT
1. BROADLEAF EVERGREEN
2. BROADLEAF DECIDUOUS
3. NEEDLELEAF EVERGREEN
4. NEEDLELEAF DECIDUOUS
5. MIXED FOREST
6. GRASS
7. HERB. PLS. OTHER THAN GR.
8. O., SPECIFY
㉙ SECONDARY HABITAT
1. CULTIVATED LAND
2. FIELD BORDER
3. ROADSIDE
4. WASTE
5. O., SPECIFY
㉚ OTHER SOURCE
1. MARKET
2. FARM STORAGE
3. EX. STATION
4. THRESHING PLACE
5. O., SPECIFY
㉛ MIXED HABITAT

㉜ ADDITIONAL DATA

33 DISTURBANCE FACTORS

1. WIND EROSION
2. WATER EROSION
3. FLOODING
4. DRAINAGE
5. IRRIGATION
6. FIRE
7. GRAZING
8. CUTTING
9. CULTIVATION
10. O., SPECIFY

TOPOGRAPHY

34 PHYSIOGRAPHY 35 LAND FORM

- | | |
|----------------|----------------|
| 1. SLOPE | 1. FLAT |
| 2. VALLEY | 2. HILLY |
| 3. PLAIN | 3. MOUNTAINOUS |
| 4. PLATEAU | 4. O., SPECIFY |
| 5. SUMMIT | |
| 6. O., SPECIFY | |

SOIL

36 SOIL CLASS

1. GRAVEL
2. SAND
3. SANDY LOAM
4. LOAM
5. LOAMY SILT
6. SILT
7. SILTY CLAY
8. CLAY
9. ORGANIC

40 SOIL DRAINAGE

1. POOR
2. MODERATE
3. WELL DRAINED
4. EXCESSIVELY DRAINED

37 SOIL STONINESS

1. FEW
2. STONY
3. VERY STONY
4. ESSENTIALLY PAVED

41 SOIL pH

1. VERY LOW (<4.0)
2. LOW (4.0-5.5)
3. MEDIUM (5.5-7.5)
4. HIGH (7.5-9.0)
5. VERY HIGH (>9.0)

SOIL COLOUR

38 INTENSITY 39 COMPOSITION

- | | |
|-----------|----------------|
| 1. LIGHT | 1. YELLOW |
| 2. MEDIUM | 2. ORANGE |
| 3. DARK | 3. RED |
| | 4. BROWN |
| | 5. BLACK |
| | 6. GREY |
| | 7. OLIVE |
| | 8. BLUE |
| | 9. O., SPECIFY |

42 SOIL SALINITY

1. NONE
2. LOW
3. MEDIUM
4. HIGH

43 ASSOCIATED WILD SPECIES OR CROPS

GENUS

SPECIES

.....	
.....	
.....	
.....	
.....	
.....	
.....	

1. ACCESSION NUMBER
2. COLLECTION NUMBER
3. COLLECTOR INITIALS
4. DAY
5. MONTH
6. YEAR
7. SITE NUMBER
8. SAMPLE NUMBER
9. COLLECTOR(S) 20/10/70/s
10. COUNTRY
11. ~~FEHERAN~~ PROVINCE
12. PRECISE LOCALITY
13. ALTITUDE
14. ASPECT
15. LATITUDE
16. LONGITUDE
17. FAMILY
18. GENUS
19. SPECIES
20. SSP.
21. VAR. OR GROUP
22. LOCAL NAME
23. SAMPLE
24. KIND OF HERBARIUM SPECIMEN
25. COMPOSITION OF COLLECTION
26. ORIGIN OF HERBARIUM SPECIMEN
27. PHOTOGRAPH
28. PRIMARY HABITAT
29. SECONDARY HABITAT

30. OTHER
31. ~~ADD~~
32. ~~YERI~~

NEAR EAST GENETIC RESOURCES CENTRE
İZMİR — TURKEY
STOCK RECORD

SERIAL NUMBER
ACCESSION NUMBER

IDENTIFICATION

FAMILY
GENUS SP
SSP VAR. OR GROUP

ORIGIN OF COLLECTIONS

1. ORIGINAL 2. REJUVENATED

PRESERVATION IN STORAGE

SEED MOISTURE DET. DATE OF SM

GERMINATION %	DATE OF GERM. TEST	GERMINATION %	DATE OF GERM. TEST
.....			
.....			
.....			
.....			
.....			

PHYSICAL LOCATION OF BASE COLLECTION

ROOM NUMBER	BLOCK NUMBER	SEGMENT NUMBER	ROW NUMBER	BOX NUMBER
.....				

DESPATCH FROM BASE COLLECTION

DESPATCH NUMBER	DATE	I QUANTITY (GRAM)	
		QUANTITY (GRAM)	BALANCE (GRAM)
.....			
.....			
.....			
.....			
.....			

PHYSICAL LOCATION OF EXCESS COLLECTION

ROOM NUMBER	BLOCK NUMBER	SEGMENT NUMBER	ROW NUMBER	BOX NUMBER
.....				

DESPATCH FORM EXCESS COLLECTION

DESPATCH NUMBER	DATE	I QUANTITY (GRAM)	
		QUANTITY (GRAM)	BALANCE (GRAM)
.....			
.....			
.....			
.....			
.....			

DESCRIPTORS OF STORAGE RECORDS

1. ACCESSION NUMBER
2. GENUS
3. SPECIES
4. SSP.? VAR.
5. GEOGRAPHIC ORIGIN (COUNTRY)
6. ROOM NO.
7. BLOCK NO.
8. PARCEL NO.
9. DRAWER NO.
10. BOX NO.
11. EXCESS STORAGE ROOM NO.
12. EXCESS STORAGE BLOCK NO.
13. EXCESS STORAGE PARCEL NO.
14. EXCESS STORAGE DRAWER NO.
15. EXCESS STORAGE BOX NO.
16. REJUVENATION DAY
17. REJUVENATION MONTH
18. REJUVENATION YEAR
19. REJUVENATION ORGANIZATION
20. REJUVENATION COUNTRY
21. REJUVENATION PROVINCE
22. GENERATIONS FROM BASE COLLECTION
23. QUANTITY--INITIAL
24. QUANTITY REMAINING AFTER DISTRIBUTION
25. NECESSARY MINIMUM QUANTITY FOR DISTRIBUTION
26. STORAGE MOISTURE CONTENT

27. DAY OF GERMINATION TEST
28. MONTH OF GERMINATION TEST
29. YEAR OF GERMINATION TEST
30. GERMINATION PERCENT

DESCRIPTORS OF COLLECTION RECORDS

1. ACCESSION NUMBER
2. COLLECTION NUMBER
3. COLLECTOR'S INITIALS
4. DAY
5. MONTH
6. YEAR
7. SITE
8. SAMPLE
9. COUNTRY
10. PROVINCE
11. PRECISED LOCALITY
12. ALTITUDE
13. ASPECT
14. LATITUDE
15. LONGITUDE
16. FAMILY
17. GENUS
18. SPECIES
19. SPECIES AUTHORITY
20. SSP. , VAR. , GRP.
21. LOCAL NAME

22. SAMPLE

1. SEED B-POP
2. SEED N-POP
3. SEED U-POP
4. POLLEN B-POP
5. POLLEN N-POP
6. POLLEN U-POP
7. VEG. B-POP
8. VEG. N-POP
9. VEG. U-POP

23. KIND OF HERBARIUM SPECIMENS

1. ROOT
2. STEM
3. LEAF
4. FLOWER
5. FRUIT
6. SEED
7. ALL
8. PRESENT

24. ORIGIN OF HERBARIUM SPECIMENS

1. COLLECTED IN THE ORIGINAL HABITAT
2. COLLECTED FROM PLANTS RAISED AT ARIC OR OTHER
EXPERIMENT STATION

25. SINGLE & MIXED SAMPLE

1. SINGLE SPECIES
2. MIXED COLLECTION

26. PHOTOGRAPH
1. HAB. COLOUR
 2. HAB. BW
 3. CLOSE-UP COL.
 4. CLOSE-UP BW
27. PRIMARY HABITAT
1. BROADLEAF EVERGREEN
 2. BROADLEAF DECIDUOUS
 3. NEEDLELEAF EVERGREEN
 4. NEEDLELEAF DECIDUOUS
 5. MIXED FOREST
 6. GRASS
 7. HERB. PLS. OTHER THAN GR.
 8. OTHER, SPECIFY
28. SECONDARY HABITAT
1. CULTIVATED LAND
 2. FIELD BORDER
 3. ROADSIDE
 4. WASTE
 5. OTHER, SPECIFY
29. OTHER SOURCE
1. MARKET
 2. FARM STORAGE
 3. EX. STATION
 4. OTHER, SPECIFY
30. MIXED HABITATS

31. DISTURBANCE FACTORS

1. WIND EROSION
2. WATER EROSION
3. FLOODING
4. DRAINAGE
5. IRRIGATION
6. FIRE
7. GRAZING
8. CUTTING
9. CULTIVATION
10. OTHER, SPECIFY

32. PHYSIOGRAPHY

- VALLEY
PLAIN
PLATEAU
SUMMIT
O., SPECIFY

33. LAND FORM

- FLAT
HILLY
MOUNTAINOUS
O., SPECIFY

34. SOIL CLASS

- GRAVEL
SAND
SANDY LOAM
LOAM
LOAM SILT
SILT
SILTY CLAY
CLAY
ORGANIC

35. SOIL STONINESS
FEW STONES
STONY
VERY STONY
ESSENTIALLY PAVED

36. SOIL DRAINAGE
POOR
MODERATE
WELL DRAINED
EXCESSIVELY DRAINED

37. SOIL PH
1. VERY LOW (4,0)
2. LOW (4,0 - 5,5)
3. MEDIUM (5,5 - 7,5)
4. HIGH (7,5 -9,0)
5. V.HIGH (9,0)

38. SOIL SALINITY
1. NONE
2. LOW
3. MEDIUM
4. HIGH

39. SOIL COLOUR
LIGHT
MEDIUM
DARK

40. SOIL TEMPERATURE
WARM

40. COLOR COMPOSITION

YELLOW

ORANGE

RED

BROWN

BLACK

GREY

OLIVE

BLUE

O., SPECIFY

41. ADDITIONAL DATA

42. ASSOCIATED WILD SP. OR CROP

Old format for data at ARIC Izmir.

IDENTIFICATION and LOCATION DESCRIPTORS

1. Accession number
2. Collection number
 1. Code of the collector
 2. Day
 3. Month
 4. Site number
 5. Sample number
3. Family
4. Genus
5. Species
6. Subspecies or botanical variety
7. Local name
8. Collection
 - 8.1. Germplasm sample
 - 8.1.1. Seed
 1. Narrow population
 2. Broad population
 3. Unknown
 - 8.1.2. Pollen
 1. Narrow population
 2. Broad population
 3. Unknown
 - 8.1.3. Vegetative
 1. Narrow population
 2. Broad population
 3. Unknown

- 8.2 Herbarium sample
 - 1. Complete specimen
 - 2. Seed
 - 3. Flower
 - 4. Pollen
 - 5. Photograph, black and white
 - 6. Slide, coloured
- 8.3 Abundance
 - 1. Scarce
 - 2. Frequent
 - 3. Very frequent
 - 4. Solid stand
- 8.4 Source
 - 8.4.1 Natural habitat
 - 8.4.1.1 Type
 - B Broadleaf evergreen
 - D Broadleaf deciduous
 - E Needleleaf evergreen
 - N Needleleaf deciduous
 - G Grass
 - L Herbaceous plants other than grass
 - 8.4.1.2 Subtype
 - A Vegetation largely or entirely absent
 - I Plants sufficiently far apart that they frequently do not touch
 - P Growth singly or in groups or patches
 - S Shrubform, minimum height about 1 M.
 - Z Dwarf shrubform, maximum height about 1 M.

- 8.4.2 Roadside
- 8.4.3 Farm storage
- 8.4.4 Market
- 8.4.5 Experimental station
- 8.4.6 Waste land
- 8.4.7 Cultivated land
 - 8.4.7.1 Crop, specify
 - 8.4.7.2 Irrigated
 - 8.4.7.3 Non-irrigated
- 8.4.8 Other, specify
- 9. Disturbance factors
 - 9.1 Degree
 - 1. Marginal
 - 2. Low
 - 3. Medium
 - 4. Intense
 - 5. Unknown
 - 9.2 Type
 - 1. Wind erosion
 - 2. Water erosion
 - 3. Flooding
 - 4. Drainage
 - 5. Irrigation
 - 6. Fire
 - 7. Grazing
 - 8. Cutting
 - 9. Fallow
 - 11. Abandoned
 - 10. Cultivation
 - 12. Fertilizer, chemical
 - 13. Fertilizer, organic
 - 14. Herbicide
 - 15. Other, specify

- 10. Expedition team
 - 1. Country code
 - 2. Organization code
 - 3. Year
 - 4. Collector
- 11. Origin
 - 1. Country code
 - 2. Province
 - 3. Precise locality, kilometer, direction
- 12. Site description
 - 12.1 Latitude
 - 1. Direction
 - 2. Degrees
 - 3. Minutes
 - 12.2 Longitude
 - 1. Direction
 - 2. Degrees
 - 3. Minutes
 - 12.3 Altitude
 - 1. Direction
 - 2. Meters
 - 12.4 Aspect, direction
 - 12.5 Slope, degrees

- 13. Topography
- 13.1 Physiography
 - 1. Depression
 - 2. Valley bottom
 - 3. Valley side
 - 4. Plain
 - 5. Terrace
 - 6. Plateau
 - 7. Convex slope
 - 8. Crest
 - 9. Summit
 - 10. Other, specify
- 13.2 Land form
 - 1. Flat
 - 2. Hilly
 - 3. Steeply dissected
 - 4. Mountainous
 - 5. Other, specify
- 14. Soil
- 14.1 Texture
 - 1. Clay
 - 2. Silt
 - 3. Sand
 - 4. Gravel
 - 5. Stones
 - 6. Boulders
 - 7. Organic
 - 8. Other, specify

- 14.2 Stoniness
1. No stones
 2. Few stones
 3. Stony
 4. Very stony
 5. Essentially paved
- 14.3 Rocks
1. None
 2. Few
 3. Frequent
 4. Many
 5. Very many
- 14.4 Drainage
1. Poor
 2. Moderate
 3. Well drained
 4. Excessively drained
- 14.5 pH
1. Very low
 2. Low
 3. Medium
 4. High
 5. Very high
- 14.6 Salinity
1. None
 2. Low
 3. Medium
 4. High

- 14.7 Colour
- 14.7.1 Intensity
 - 1. Very light
 - 2. Light
 - 3. Medium
 - 4. Dark
 - 5. Very dark
- 14.7.2 Composition
 - 1. White
 - 2. Yellow
 - 3. Orange
 - 4. Red
 - 5. Brown
 - 6. Black
 - 7. Grey
 - 8. Other, specify
- 15. Climate
- 15.1 Type, code
 - 1. Tropical forest climates
 - 2. Dry climates
 - 3. Steppe or semiarid climate
 - 4. Desert or arid climate
 - 5. Mesothermal forest climates
 - 6. Microthermal, snow-forest climates
 - 7. Polar climates
 - 8. Tundra climate

15.2 Subtype, code

A

B

C

D

F

H

K

M

N

O

S

W

16. Associated species

17. Other information

B. MORPHOLOGICAL DESCRIPTORS

- 1.0 Duration
 - 1. Annual
 - 2. Biennial
 - 3. Perennial
- 2.0 Root
 - 1. Fibrous
 - 2. Rhizomatus
- 3.0 Stem
- 3.1 Direction
 - 1. Erect
 - 2. Diffuse
 - 3. Decumbent
 - 4. Procumbent
- 3.2 Height
- 3.3 Thickness
- 3.4 Colour
 - 1. Yellow
 - 2. Yellow-green
 - 3. Blue-green
 - 4. Purple
 - 5. Brown
- 3.5 Surface
 - 1. Glabrous
 - 2. Scabrous
 - 3. Pubescent
 - 4. Glaucous

- 3.6 Hairs below the spike
 - 1. Dense
 - 2. Sparse
 - 3. Absent
- 3.7 Nodes
 - 3.7.1 Number
 - 3.7.2 Shape
 - 1. Convex
 - 2. Cylindrical
 - 3. Concave
 - 3.7.3 Colour
 - 1. Yellow
 - 2. Yellow-green
 - 3. Blue-green
 - 4. Purple
 - 5. Brown
 - 3.7.4 Pubescence
 - 1. Glabrous
 - 2. Pubescent
- 4.0 Leaf
 - 4.1 Sheath
 - 4.1.1 Length
 - 4.1.2 Colour
 - 1. Yellow
 - 2. Yellow-green
 - 3. Blue-green
 - 4. Purple
 - 5. Brown

- 4.1.3 Surface
 - 1. Glabrous
 - 2. Scabrous
 - 3. Pubescent
 - 4. Glaucous
- 4.2 Ligule
 - 1.
 - 2.
 - 3.
 - 4.
 - 5.
 - 6.
- 4.3 Auricle
 - 4.3.1 Shape
 - 1. Rye type
 - 2. Oat type
 - 3. Wheat type
 - 4. Barley type
 - 4.3.2 Colour
 - 1. Yellow
 - 2. Yellow-green
 - 3. Blue-green
 - 4. Purple
 - 5. Brown
 - 4.3.3 Surface
 - 1. Glabrous
 - 2. Pubescent

- 4.4 Blade
 - 4.4.1 Length
 - 4.4.2 Width
 - 4.4.3 Colour
 - 1. Yellow
 - 2. Yellow-green
 - 3. Blue-green
 - 4. Purple
 - 5. Brown
 - 4.4.4 Surface of the upper side
 - 1. Glabrous
 - 2. Scabrous
 - 3. Pubescent
 - 4. Glaucous
 - 4.4.5 Surface of the lower side
 - 1. Glabrous
 - 2. Scabrous
 - 3. Pubescent
 - 4. Glaucous
 - 4.4.6 Position
 - 1. Upright
 - 2. Intermediate
 - 3. Hanging down
- 4.5 Flag leaf
 - 4.5.1 Length
 - 4.5.2 Width
 - 4.5.3 Position
 - 1. Upright
 - 2. Intermediate
 - 3. Hanging down

- 5.0 Spike
- 5.1 Length
- 5.2 Width
- 5.3 Number of spikelets
- 5.4 Number of flowers per spikelet
- 5.5 Rachis
 - 5.5.1 Brittleness
 - 1. Brittle
 - 2. Semi-brittle
 - 3. Tough
 - 5.5.2 Pubescence at the angles
 - 1. Glabrous
 - 2. Pubescent
 - 5.5.3 Branchiness
 - 1. Simple
 - 2. Branched
 - 5.5.4 Segment
 - 5.5.4.1 Length
 - 5.5.4.2 Width
- 5.6 Glumes
 - 5.6.1 Shape
 - 1. Rhomboid
 - 2. Lanceolate
 - 3. Other specify
 - 5.6.2 Nerves
 - 5.6.2.1 Number

- 5.6.2.2 Colour
 - 1. Yellow
 - 2. Yellow-green
 - 3. Blue-green
 - 4. Purple
 - 5. Brown
- 5.6.3 Surface
 - 1. Glabrous
 - 2. Scabrous
 - 3. Pubescent
 - 4. Glaucous
- 5.6.4 Keel and edges
 - 1. Ciliate
 - 2. Fimbriate
 - 3. Glabrous
- 5.6.5 Length
- 5.6.5.1 Lower glume
- 5.6.5.2 Upper glume
- 5.6.6 Width
- 5.6.6.1 Lower glume
- 5.6.6.2 Upper glume
- 5.6.7 Projection
- 5.6.7.1 Length
- 5.6.7.1.1 Lower glume
- 5.6.7.1.2 Upper glume
- 5.6.7.2 Colour
 - 1. Yellow
 - 2. Yellow-green
 - 3. Blue-green
 - 4. Purple
 - 5. Brown

- 5.7 Lemma
- 5.7.1 Length
- 5.7.2 Width
- 5.7.3 Colour
 - 1. Yellow
 - 2. Yellow-green
 - 3. Blue-green
 - 4. Purple
 - 5. Brown
- 5.7.4 Surface
 - 1. Glabrous
 - 2. Scabrous
 - 3. Pubescent
 - 4. Glaucous
- 5.7.5 Nerves
- 5.7.5.1 Colour
 - 1. Yellow
 - 2. Yellow-green
 - 3. Blue-green
 - 4. Purple
 - 5. Brown
- 5.7.5.2 Number
- 5.7.6 Keel and edges
 - 1. Ciliate
 - 2. Fimbriate
 - 3. Glabrous
- 5.7.7 Awn

- 5.7.7.1 Colour
 - 1. Yellow
 - 2. Yellow-green
 - 3. Blue-green
 - 4. Purple
 - 5. Brown
- 5.7.7.2 Length
- 5.7.7.3 Surface
 - 1. Smooth
 - 2. Tough
- 5.8 Palea
- 5.8.1 Length
- 5.8.2 Width
- 5.8.3 Colour
 - 1. White
 - 2. Other specify
- 5.8.4 Surface
 - 1. Membranaceous
 - 2. Other specify
- 5.8.5 Nerves
- 5.8.5.1 Colour
 - 1. Yellow
 - 2. Yellow-green
 - 3. Blue-green
 - 4. Purple
 - 5. Brown
- 5.8.5.2 Number

- 5.9 Androeceum
- 5.9.1 Anther
- 5.9.1.1 Length
- 5.9.1.2 Colour
 - 1.
 - 2.
 - 3.
- 5.9.2 Pollen
- 5.9.2.1 Diameter
- 5.9.2.2 Colour
 - 1.
 - 2.
 - 3.
- 5.9.2.3 Surface
 - 1.
 - 2.
- 5.10 Gynoeceum
- 5.10.1 Ovary
- 5.10.1.1 Pubescence
 - 1. Glabrous
 - 2. Pubescent
- 5.10.2 Stigma
- 5.10.2.1 Pubescence
 - 1. Glabrous
 - 2. Pubescent
- 5.10.2.2 Length

- 5.11 Caryopsis
 - 1. Enclosed
 - 2. Open
- 5.11.1 Length
- 5.11.2 Width
- 5.11.3 Thousand grain weight
- 5.11.4 Shape
 - 1. Long-thin
 - 2. Long-fat
 - 3. Short-thin
 - 4. Short-fat
- 5.11.5 Colour
 - 1. White
 - 2. Yellow
 - 3. Blue-green or grey
 - 4. Red
 - 5. Brown
- 5.11.6 Pubescence at the top
 - 1. Glabrous
 - 2. Pubescent

EXAMPLE "I"

A. IDENTIFICATION and ORIGIN DESCRIPTORS

1. K-45
2. MAGISTRATE 301237
3. GRAMINEAE
4. SECALE
5. AFRICANUM STAFF.
- 8.2 COMPLETE SPECIMEN
11. SOUTH AFRICA SUTHERLAND
17. EXICCATED FROM NATIONAL HERBARIUM PRETORIA LOCATED AT HERBARIUM
ROYAL BOTANIC GARDEN, KEW

B. MORPHOLOGICAL DESCRIPTORS

1. PERENNIAL
2. RHIZOMATOUS
- 3.2 90 CM.
- 3.3 0.25 CM.
- 3.4 YELLOW
- 3.5 GLABROUS
- 3.6 DENSE
- 3.7.1 6
- 3.7.2 CONCAVE
- 4.2 BORDERED
- 4.3.1 RYE TYPE
- 4.4.4 PUBESCENT, SCABROUS
- 4.4.5 PUBESCENT
- 5.2 0.7 CM.

5.4	2
5.5.1	BRITTLE
5.5.2	PUBESCENT
5.5.3	SIMPLE
5.5.4.1	0.3 CM.
5.5.4.2	0.15 CM.
5.6.1	LANCEOLATE
5.6.4	CILIATE
5.6.5.1	0.9 CM.
5.6.5.2	1.1 CM.
5.6.6.1	0.5 CM.
5.6.6.2	0.5 CM.
5.6.7.1.1	0.15 CM.
5.6.7.1.2	0.15 CM.
5.6.7.2	PURPLE
5.7.1	1.15 CM.
5.7.2	0.15 CM.
5.7.3	YELLOW
5.7.4	PUBESCENT
5.7.5.1	PURPLE
5.7.5.2	5
5.7.6	CILIATE
5.7.7.1	PURPLE
5.8.1	1.1 CM.
5.8.3	YELLOW
5.8.4	MEMBRANEUS
5.8.5.1	PURPLE
5.8.5.2	2

5.11	ENCLOSED
5.11.1	1.15 CM.
5.11.4	LONG-THIN
5.11.5	BROWN
5.11.6	PUBESCENT

P R O G R A M

A. IDENTIFICATION AND ORIGIN DESCRIPTORS

ACCESSION NUMBER (1 CODE K, ORDER FROM 0 TO 45)

COLLECTION NUMBER (2 CODE MAGISTRATE, ORDER FROM 0 TO 301237)

FAMILY (3 CODE GRAMINEAE)

GENUS (4 CODE SECALE)

SPECIES (5 CODE AFRICANUM STAFF.)

HERBARIUM SAMPLE (8.2 CODE COMPLETE SPECIMEN)

ORIGIN (11 CODE SOUTH AFRICA, SUTHERLAND)

OTHER INFORMATION (17 CODE EXICCATED FROM NATIONAL HERBARIUM PRETORIA,
LOCATED AT HERBARIUM ROYAL BOTANIC GARDEN, KEW)

B. MORPHOLOGICAL DESCRIPTORS

DURATION (1 CODE PERENNIAL)

ROOT (2 CODE RHIZOMATOUS)

STEM HEIGHT (3.2 ORDER FROM 0 TO 90 IN CM)

STEM THICKNESS (3.3 ORDER FROM 0 TO 0.25 IN CM)

STEM COLOUR (3.4 CODE YELLOW)

STEM SURFACE (3.5 CODE GLABROUS)

HAIRS BELOW THE SPIKE (3.6 CODE DENSE)

NUMBER OF NODES (3.7.1 ORDER FROM 0 TO 6)

SHAPE OF NODES (3.7.2. CODE CONCAVE)

LIGULE (4.2 CODE BORDERED)

AURICLE SHAPE (4.3.1 CODE RYE TYPE)

BLADE, UPPER SURFACE (4.4.4 CODE PUBESCENT AND SCABROUS)

BLADE, LOWER SURFACE (4.4.5 CODE PUBESCENT)

SPIKE WIDTH (5.2 ORDER FROM 0 TO 0.7 IN CM)

RACHIS BRANCHINESS	(5.5.3 CODE SIMPLE)
SEGMENT LENGTH	(5.5.4.1 ORDER FROM 0 TO 0.3 IN CM)
SEGMENT WIDTH	(5.5.4.2 ORDER FROM 0 TO 0.15 IN CM)
GLUME SHAPE	(5.6.1 CODE LANCEOLATE)
GLUME KEEL AND EDGES	(5.6.4 CODE CILIATE)
LOWER GLUME LENGTH	(5.6.5.1 ORDER FROM 0 TO 0.9 IN CM)
UPPER GLUME LENGTH	(5.6.5.2 ORDER FROM 0 TO 1.1 IN CM)
LOWER GLUME WIDTH	(5.6.6.1 ORDER FROM 0 TO 0.5 IN CM)
UPPER GLUME WIDTH	(5.6.6.2 ORDER FROM 0 TO 0.5 IN CM)
LOWER GLUME PROJECTION LENGTH	(5.6.7.1.1 ORDER FROM 0 TO 0.15 IN CM)
UPPER GLUME PROJECTION LENGTH	(5.6.7.1.2 ORDER FROM 0 TO 0.15 IN CM)
PROJECTION COLOUR	(5.6.7.2 CODE PURPLE)
LEMMA LENGTH	(5.7.1 ORDER FROM 0 TO 1.15 IN CM)
LEMMA WIDTH	(5.7.2 ORDER FROM 0 TO 0.15 IN CM)
LEMMA COLOUR	(5.7.3 CODE YELLOW)
LEMMA SURFACE	(5.7.4 CODE PUBESCENT)
LEMMA NERVES COLOUR	(5.7.5.1 CODE PURPLE)
LEMMA NERVES NUMBER	(5.7.5.2 ORDER FROM 0 TO 5)
LEMMA KEEL AND EDGES	(5.7.6 CODE CILIATE)
LEMMA AWN COLOUR	(5.7.7.1 CODE PURPLE)
PALEA LENGTH	(5.8.1 ORDER FROM 0 TO 1.1 IN CM)
PALEA COLOUR	(5.8.3 CODE YELLOW)
PALEA SURFACE	(5.8.4 CODE MEMBRANEOUS)
PALEA NERVES COLOUR	(5.8.5.1 CODE PURPLE)

CARYOPSIS	(5.11 CODE ENCLOSED)
CARYOPSIS LENGTH	(5.11.1 ORDER FROM 0 TO 1.15 IN CM)
CARYOPSIS SHAPE	(5.11.4 CODE LONG-THIN)
CARYOPSIS COLOUR	(5.11.5 CODE BROWN)
CARYOPSIS PUBESCENCE AT THE TOP	(5.11.6 CODE PUBESCENT)

EXAMPLE "2"

- 1 TR.
- 2 AS0706720201
- 3 GRAMINEAE
- 4 SECALE
- 5 ANCESTRALE ZHUK.
- 8.1.1 BROAD-POPULATION
- 8.2 COMPLETE SPECIMEN
- 8.3 VERY FREQUENT
- 8.4.8 RIVER BANK
- 9.1 LOW
- 9.2 FLOODING
- 10 TR, ARIC, 72, H.A.SENCER
- 11 TR, IZMIR, MENEMEN-GUZELHISAR QAYI
- 12.3 10 M.
- 13.1 PLAIN
- 13.2 FLAT
- 14.1 SAND, SANDY LOAM
- 14.2 NO STONES
- 14.3 NONE
- 14.4 WELL-DRAINED
- 14.5 MEDIUM
- 14.6 NONE
- 14.7.1 VERY LIGHT
- 14.7.2 BROWN
- 16 SILYBUM MARIANUM
NOTOBASIS SYRIACA

EXAMPLE "2"

P R O G R A M

IDENTIFICATION AND LOCATION DESCRIPTORS

ACCESSION NUMBER	(1 CODE TR, ORDER FROM 0 TO)
COLLECTION NUMBER	(2 CODE AS, ORDER FROM 0 TO 0706720201)
FAMILY	(3 CODE GRAMINEAE)
GENUS	(4 CODE SECALE)
SPECIES	(5 CODE ANCESTRALE ZHUK.)
SEED COLLECTION	(8.1.1 CODE BROAD-POPULATION)
HERBARIUM SAMPLE	(8.2 CODE COMPLETE SPECIMEN)
ABUNDANCE	(8.3 CODE VERY FREQUENT)
SOURCE	(8.4.8 CODE RIVER BANK)
DISTURBANCE FACTORS DEGREE	(9.1 CODE LOW)
DISTURBANCE FACTORS TYPE	(9.2 CODE FLOODING)
EXPEDITION TEAM	(10 CODE TR, ARIC ORDER FROM 0 TO 72, CODE H. A. SENCER)
ORIGIN	(11 CODE TR, IZMIR, MENEMEN-GUZELHISAR ÇAYI)
ALTITUDE	(12.3 ORDER FROM 0 TO 10 IN METERS)
TOPOGRAPHY PHYSIOGRAPHY	(13.1 CODE PLAIN)
LAND FORM	(13.2 CODE FLAT)
SOIL TEXTURE	(14.1 CODE SAND)
SOIL STONINESS	(14.2 CODE NO STONES)
ROCKS	(14.3 CODE NONE)
DRAINAGE	(14.4 CODE WELL-DRAINED)
pH	(14.5 CODE MEDIUM)
SALINITY	(14.6 CODE NONE)
SOIL COLOUR INTENSITY	(14.7.1 CODE VERY LIGHT)
SOIL COLOUR COMPOSITION	(14.7.2 CODE BROWN)
ASSOCIATED SPECIES	(16 CODE SILYBUM MARIANUM, NOTOBASIS SYRIACA)

Seminar in IR for Introduction Unit - A.R.I.C.

11 June 1973

A. What is to be done:

1. Give the background philosophy for "data management";
2. Give some understanding of what computers can do;
3. Give some understanding of TAXIR, and for Ayla, two additional taximetric programmes;

B. Why? Many different approaches to data management;

1. Most information systems designed for very specific purposes;
2. Very few systems designed for generality;
3. Very few systems designed for the user - most systems require the user to be an expert computer type;
4. Therefore, our systems which are general, and designed to be used by people without expert knowledge of computing machines.

C. Basic concepts for our systems;

1. Reflection of methods already known and understood- that is, the biological discipline of taxonomy.
2. The methods employed consider the structure of informations, not the substantial content of information.

1/2
^

Example- Words consist of letters (including consonants and vowels) - this is the structure of a word -

3. The concepts of taxonomy useful in building our IR system;

a) The binominal scientific terms

Genus = a noun

Species = an adjective

Triticum = wheat

aestivum = a particular
kind of wheat

This combination designates very precisely one kind of wheat-

Likewise - a Descriptor in IR is a noun

a D.S. in IR is an adjective describing the noun

Example- Desc. = colour

D.S. = red, green, blue, etc.

The Latin binominal is an exclusive system- the two terms allow no overlap with anything else;

Likewise a descriptor and associated descriptor state are mutually exclusive-

Example- Colour of stem

Red

Yellow

Red-Yellow; this for only exhibiting the colour mixture.

Seminar No. 2 - IR for Introduction Unit A.R.I.C.

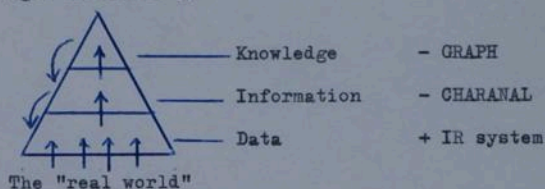
12 June 1973

A. Review of last Seminar;

1. Comparative methods
2. Descriptive methods generally
Mutual exclusive states for description.

B. Why do we document ?

1. The triangle of knowledge



C. Returning to methods of description ;

1. The item: the objects which form the basis for description
2. The Descriptor: a single basis for comparison
3. " " State: the precise description of each item

D. What kind of data can be made into descriptors;

1. No limit - any data recorded as numbers, letters, or combinations - therefore, qualitative or quantitative.
2. Data may be extrinsic to the item (ex.: collection number), or may be intrinsic to the item (ex.: shape of leaf)

E. Structure of Descriptors, in terms of the type of information they represent;

1. NAME descriptor: usually words - any combination up to 90 letters,
2. CODED descriptors: a form of the name descriptor in which the order of the descriptor state names assigns them in consecutive sequence, starting with one - Coding facilitates the input (recording) process.
3. ORDER descriptors: states of an ordered descriptor are numbers defined in a "from-to" format, giving maximum range of included data, from smallest to largest.

EXERCISE:

A set of objects provided-

Make them into items which will be described for a data bank;

Number the items consecutively;

Decide on descriptors, and descriptor states;

Make into a data bank

Descriptors

Items

1	
2	
3	
4	
5	
6	
7	
8	
9	
10	

Seminar No. 3 - Introduction Unit - A.R.I.C.

13 June 1973

1. Recording System;

Items numbered consecutively: The numbers used in this Unit are the accession numbers already used.

For each item, choose a list of appropriate descriptors. In this Unit, we are presently working on the collection record, which has a number of descriptors, describing the collections in the field.

There are also other records- storage, germination, etc. In most cases, the Item is the accession, and in many, descriptors are the same.

The order of the descriptors to be recorded is determined by those involved, with the approval and consent of the Documentation Section.

Once the order of the descriptors has been decided, this order must be maintained. The reasons for strict adherence to the decided order will be explained in a seminar, where we describe TAXIR.

The type of descriptor (NAME, CODED, ORDER) should be considered before the process of recording data begins. This facilitates the actual recording process;

Usually, all numerical data will be ORDER descriptors, and the descriptor states are the numbers describing each item.

Certain names can also be ~~ORDER~~ descriptors, for example, the months of the year.

CODED descriptors are used when a known number of descriptor states can be determined, for example, the collection record has a number of descriptors that are coded.

Free field format for actually recording data. Since we do not know in advance just how long some of our descriptor states will be, and since in some of our descriptors will have states that vary in length, we do not restrict the number of positions which will be used in placing. The data into machine-readable format. This is a departure from the older process where every descriptor was assigned a number of predetermined spaces on the punch card, a process which very frequently required assignment of abbreviations, and this has the very significant risk of losing information. For the above reasons, TAXIR is designed to accept free-field formats.

Separators for the free-field format. We indicate the completion of any one descriptor by placing a comma after the descriptor state.

Upon completion of the recording of all descriptors for an Item, we indicate this completion by placing an asterisk (*) at the end.

Thus, a completed descriptor of any one item contains the Item, its identifying accession number, and the descriptor states for each descriptor, each separated by a comma, and at the end of the description an asterisk. It is not necessary to write down the descriptor each time.

15 June 1973

- A. Before proceeding to discussion of TAXIR, need a short discussion on computing machines;

1. What they are and what they do;
2. The physical equipment referred to as "hardware";
3. The sets of written instructions which direct the functions of the hardware -the programs- referred to as "software".

- B. Basic concepts of hardware;

Input ---- compute ---- output

1. Input ; any of several devices by which data and software are presented to the machine; such as keypunch, paper tape, magnetic tape, etc.
2. Computer; consists of a Central Processing Unit (CPU) and associated memory units; such as discs or drums.
 - a) In the CPU all instructions (programs) are executed.
 - b) Size of CPU is a measure of the capacity of the machine-measured usually in two terms: size of internal memory, and speed of computation;
 - i) internal memory of CPU referred to as "core memory".
 - ii) memory is measured in "bits" and "words".
 - iii) a "bit" is a single on-off signal- stores one character.
 - iv) a "word" is a set of "bits", determined as one unit. Design of the hardware determines the length of a word. IBM uses a 32-bit word, UNIVAC 36, and Control Data either 48 or 64 bit word size.
 - v) Size of CPU memory varies, depending on design and cost. A small size machine will have 8,000 words, a medium size 16-32,000 words, and the largest computers may have over 200,000 words -in the jargon of the computing field 1,000 = "K", so a small machine will have "8K" memory, medium "32K" and large one "200K".
 - c) Speed of the operations can approach the speed of light, measured in extremely small fractions of a second, the smallest fraction being the "nanosecond", or $1/1,000,000$ of a second. (1×10^{-6})
 - d) Associated memory to CPU may be of two general types;
 - i) Magnetic tape - the tape stores electronic signals much the same as in a tape recorder. While very large quantities of data may be stored on "mag tape" this is the slowest type from which to recover the data for processing in the CPU.
 - ii) Disc or drum memory - frequently referred to as "random access" memory, stores incredibly large quantities of data, frequently over 1,000,000 bits (10^6). Much faster recovery of data than from tapes.

- B. 3. Output from computer takes several forms, usually printed, but may be another mag tape, another set of punched cards, on microfilm or sometimes a ~~XXXXXX~~ display device like a TV tube, referred to as a cathode ray tube (CRT).

Printing machines vary in speed, increasing as the size of the machine increases, up to about 2,000 lines of 128 characters each per minute.

C. Basic concepts of software;

1. The idea of a predetermined method of directions;
 - a) In our mind we have a set of instructions to add, subtract, order, and follow through some procedure to accomplish any task.
 - b) The computing machine has no such "built-in" set of instructions, and must be directed to accomplish each step in the correct order in order to complete any task. The task can be any type, from solving equations to finding some piece of data for retrieval.
 - c) The above indicates that we must use a "stored" program, to direct the computer.
 - d) The computer actually works in ~~XXXXX~~ a very simple manner, by answering a series of yes-no type questions, or, in terms of electronic signals instead of yes-no, on-off. This means of signals to direct the computer is called "machine" language.
 - e) "Machine" language is very confusing to a person because it looks like nothing but a series of zeros and ones (0, 1). Instructions (programs) in machine language are very long and involved.
2. The concept of a "higher" language;
 - a) Since we understand, and feel more comfortable with, instructions which look more like natural language, computer specialists have developed several program languages which can be "interpreted" by the machine. These languages have become universally accepted by all computer manufacturers, so that any machine can use these "higher" languages. One such language, of greatest general acceptance is called by the acronym FORTRAN for "formula translation".

16 June 1973

Description of TAXIR ;

A. Description of the Program:

1. 2000 FORTRAN statements (more or less) instruct the computer to perform all necessary functions required in information storage and retrieval.
2. The FORTRAN used is one that is functional on medium to large size computing machines.
3. Each FORTRAN statement causes the machine to perform some necessary activity.
4. The first such statement, for example, essentially turns on the machine - START.
5. From this first statement onward, the TAXIR program places the data bank in storage, and then makes the data available to retrieve (to ask questions).
6. Other FORTRAN statements cause the machine to produce ^(print)~~(print)~~ a number of useful outputs.

B. Commands or statements, in certain FORMAT, allows the user to perform functions which are required;

1. The first command made by the user tells the computer to DEFINE ITEMS from cards or tapes; with each item, one defines the descriptors (and their type) which tells the machine which set of descriptors will be included in that data bank - separate data banks can be built from one set of input data cards. In the Introduction Unit, a data bank for accessions for the herbarium, for the storage functions (1) Long term storage; (2) Distribution; (3) Working collection.
- All Capital* 2. After the command build data bank, the program automatically lists (prints) all items and the full set of descriptors, and descriptor states, with a list of errors in the data. The list of errors tells the user all the mistakes made by the keypunch operator; i.e. an item with too few descriptors, or an illegally prepared descriptor state.
3. Another command, executed after all corrections are made, causes the computer to provide a CONTROL VOCABULARY (CV). *under* The CV is a list of each descriptor, and ~~under~~ each descriptor, each descriptor state. The CV tells the user all the words he has used in defining each item. It tells the user whether one word has been spelled several different ways (such as country of origin may have been spelled more than one way "TERKEY", "TORKEY" and "TURKEY"; where obviously only "TURKEY" is correct),

- B.
4. With the Control Vocabulary, one may also discover that several descriptor states are synonymous, and unnecessary.
 5. The next command available is "CORRECTION", to correct the mistakes made in any descriptor, or descriptor state.
 6. Still other commands are "ADD MORE DESCRIPTORS/DESCRIPTOR STATES (where more data are required); "DELETE DESCRIPTOR/DELETE ITEM" (where duplication has occurred, or some other mistake in the data has been made).

C. Questioning the data banks

1. After all the problems in "B" have been solved, one is ready to use the data bank in any of many different ways:

- a) Complete lists of all items in the bank, with certain descriptors:
Example: PRINT : items with country of collection, TURKEY*
The results will be a collection of all types of accessions made in Turkey, including everything the data bank contains from this country.
- b) Precisely defined answers to specific requirements:
Example: PRINT : PRECISE LOCALITY, ASPECT, LATITUDE and LONGITUDE for items with GENUS SECALE and SPECIES montanum but not SPECIES CEREALE.
- c) ACCESSION No.
Example: PRINT : ROOM, SHELF no, BOX NUMBER for items with GENUS TRITICUM and SPECIES AESTIVUM and VARIETY and LOCALITY AFGHANISTAN or IRAN.

Note use of certain words; and, or, not. These permit formulation of many types of precise questions, giving the user a limitless number of ways to derive the most benefit from his data.

Because of the freedom in formatting data, and because of the flexibility of the TAXIR program, the user is provided with a long-sought tool.

The ability to change, modify, add or delete information is part of the system.

TAXIR has a number of allied programs which can be used, for example: Statistical analysis of data
Plotting and contouring on maps
Character analysis and clustering program
(TAXIMETRIC PROGRAMS)

TAXIR is, therefore, not just a computer program, but rather a number of programs integrated into a system. Learning to use the system takes some time, but the results and benefits far outweigh the costs.

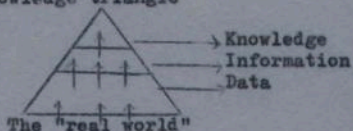
LECTURE TO STAFF OF A.R.I.C.

Information Management for Agricultural Science

18 June 1973

- A. Who uses information?
1. All persons here
 - a) Some formally - notebooks, files, reports
 - b) Some informally - we remember things in our head.

- B. Why to use information?
1. The knowledge triangle



- C. Costs of information;
1. Time involved
 2. Libraries usual repository of knowledge
- D. These considerations lead to the conclusion that we manage the informations;
1. Purpose is to make our work more effective for the costs involved.
 2. Methods of management:
 - a) Simple, well-known manual methods for small quantities,
 - b) More complex, machine-assisted for large quantities.
- E. Complex systems take advantage of computing machine capacity. One system using computer is TAXIR-
1. What is TAXIR?- A means to use computer to store (place in computer memory) and retrieval (ask questions about) informations.
 2. A series of instructions to the computer to tell the machine what to do with our data.
- F. Types of data:
1. Alphabetic
 2. Numeric
 3. Combinations of these
- G. Means to use the data:
1. The ITEM
 2. The Descriptor
 3. The Descriptor-state.
- H. With data formatted as above:
1. Any question can be asked about the data.
 2. The management techniques allow adding data, or changing data as needed.
 3. Permanent records are kept in very precise storage in the computer, thus saving space and time.

Report of Conferences on the Standardized
Documentation of Plant Genetic Resources
Held
During and After the EUCARPIA Conference
on
European and Regional Genebanks April 1972
at Izmir, Turkey

Participants in the discussions were:

Prof. Dr. D. Bommer	Institut fuer Pflanzenbau und Saatgutforschung der Forschungsanstalt fuer Landwirt- schaft Braunschweig-Voelkenrode Federal Republic of Germany
Dr. T. T. Chang	International Rice Research Institute, Los Baños, Philippines
Sir Otto Frankel	IBP Subcommittee for Plant Gene Pools, Canberra City, A.C.T., 2600, Australia
Dr. U. Gullberg	UNDP/FAO, Range Management Project, Nairobi, Kenya
Mr. Z. Huaman	Centro Internacional de Papa, Lima, Peru
Prof. Dr. J. G. Hawkes	The University of Birmingham, Department of Botany Birmingham B15 2TT, Great Britain
Dr. E. Kjellqvist	Agricultural Research and Intro- duction Center, Izmir, Turkey
Prof. Dr. C. F. Konzak ⁺	Department of Agronomy and Soils, Washington State University, Pullman, Wash. 99163, USA
Prof. em. Dr. H. Kuckuck	Institut fuer angewandte Genetik Technische Universität Hannover, Federal Republic of Germany
Dr. H. Lamberts	Stichting voor Planteveredeling Wageningen, Netherlands
Prof. Dr. E. Porceddu	C.N.R., Laboratorio del Germo- plasma, Bari, Italy
Prof. Dr. D. Rogers ⁺⁺	Gulf Universities Research Consortium, Bay St. Louis, Mississippi 39520, USA

Prof. Dr. T. Scarascia-
Mugnozza

Istituto di Miglioramento
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Mr. L. Seidewitz

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Saatgutforschung der
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Mrs. N. Settar

Agricultural Research and Intro-
duction Center, Izmir, Turkey

Dr. B. Snoch

John Innes Institute, Department
of Applied Genetics, Norwich,
United Kingdom

Prof. Dr. V. Tayşi

Agricultural Research and Intro-
duction Center, Izmir, Turkey

Dr. P. Thompson

Kew Gardens, United Kingdom

+ Coordinator, FAO/IAEA working group on international
standardization in crop research data recording

++ Designer of the Taxonomic Information and Retrieval System (TAXIR)

The meetings were held to discuss a proposed standard collection record and principles for standardizing the methods on recording data on genetic resources material. Proposals and suggestions made in this connection were unanimously accepted by the participants and it was recommended that other programs dealing with genetic resources material adopt the same procedures.

A standard field collection record form and procedure manual as improved from a similar form used by the Izmir center. The plant explorers and plant genebanks representatives present agreed to use the forms in their programs and asked the cooperation also of plant explorers from other institutions. Copies of the standard record forms and manual may be obtained by writing to the Director, Agricultural Research and Introduction Center, Izmir-Karsiyaka, Turkey.

For the standardization in principles of research data recording, a common denominator for all systems was found, being 1 - 9, 0, +, X, in order to express increasing degree of expression (1-9), absence or presence of a characteristic (0 or + resp.), and mixed expression (X).

Responses to pests and diseases will be coded where letters L, M and H will correspond numerical coding that has been used in coding responses.

L stands for 1, 2, 3

M stands for 4, 5, 6

H stands for 7, 8, 9

O means no reaction (no response) at all (+)

(+) Following changes are suggestions of Prof. C. F. Konzak's:

R stands for 1, 2, 3 (HR, R, MR respectively)

M stands for 4, 5, 6 (LR, M, LS respectively)

S stands for 7, 8, 9 (MS, S, HS respectively)

O stands for no reaction (immune response)

For environmental influences the above coding as before:

L (for "low")

M (for "medium" or "intermediate")

H (for "high")

Those suggestions had been made by Prof. Konzak in a letter dd. May 12th, 1972, to Prof. Hawkes.

It was decided that documentation specialists should meet again during the next days for more detailed discussions and agreements. Therefore a group of specialists met on April 15th to 17th, 1972. Participants in these discussions were:

Prof. Konzak
Prof. Rogers
Prof. Porceddu
Dr. Gullberg
Dr. Kjellqvist
Mrs. Settar
Miss Sencer
Mr. Seidewitz
Mr. Huaman

During those sessions following problems were discussed:

1. International coordination of the coding series of accession of genetic resources materials acquired and conserved by breeding institutions and genetic resources centers. It was recommended that the FAO-IAEA working group proceed to assist as a "clearing house" for the allocation of unique codes to the various stations and the Bari genetic resources center were assigned responsibility for coordinating this work.
2. Composition of data banks for genebank maintenance, including
 - a) accession number
 - b) appropriate identification descriptors and other general information associated with each genebank accession.

3. Composition of data banks for information on description and evaluation of accessions, including
 - a) phenotypical description on
morphology
quality
physiology
 - b) genotypical description
(no specific proposal was presented nor discussed here)
4. General flowcharts for data input and output.
5. The adaptability of TAXIR (taxonomic information and retrieval system) for electronical data management was reviewed. The system was developed by Prof. Rogers at Colorado State University, Boulder, Colorado. The use of that system for the development of an information system was considered to be of sufficient advantage based on experiences at Pullman (Washington State University) and the Genebank at Bari, Italy, for its speed, efficiency and economy. It was recommended for adoption by other genebanks. Testing of TAXIR is at the initial stages to Braunschweig and attempts would be made to determine ways to apply to the data on genetic materials conserved at ARIC, Izmir.
6. Recommendations for the design of a thesaurus to aid in the worldwide standardization on information in form of a multi-lingual dictionary of descriptive terms, part of which will be illustrated, were made. This thesaurus will be made available to those who record information for a genebank, so that they have a guideline on how to describe their data in line with that used at the genebanks. Part of this thesaurus concerning various crops has been compiled by Seidewitz, Konzak and others in behalf of the FAO-IAEA Working Group.
The various international agencies will be approached to help in the further development and completion of this thesaurus. Principles and features designed for a compilation of standard procedures for recording data relative to the identification description and evaluation of plant genetic resources materials

were reviewed and a preliminary model including illustrated guides for the recording of data was presented and approved by the participants.

The work on the development of these standardized data recording guides for certain crops is proceeding at Pullman, Washington State University, and Braunschweig as part of an effort by the aforementioned Working Group.

7. The need for a type of reference retrieval system in addition to TAXIR was recognized to be able to retrieve text information. Since it was known that several reference systems are freely available; for use with different equipment, no specific recommendation was made, until at least some extensive testing could be conducted with information about genetic resources materials.

For further standardization it was suggested that a uniform set of procedures be established for the acquisition or entry, management and distribution of genetic resources materials by genetic resources centers.

Notes

For : Izmir documentation work shop May 14-17, 1974.

1. Important to remember that what you say (record) will be important for years to come, and for many different people besides yourself.

Therefore; 1. Accuracy is a critical matter, as important to scientific plant breeding and other applications as the collections themselves.

2. You are actually a member of a large team of agricultural workers - for your own country and for the whole world.

3. You can be known as a great contributor if you do well, or you can be criticized for poor work if you do not participate in a scientific manner.

2. Your work as a collector is the first step in a series of steps which will eventually determine whether we survive on earth, whether your children and mine will have enough good food or, alternatively, suffer untold misery from hunger and malnutrition.

Your collections will preserve that great gift to all mankind- the beautifully varied and highly potent material- the genetic resources of plants that feed, cloth and shelter us - .

Training session - May 1974

IZMIR TRIP

took a cup full of seeds and dispersed them randomly on a table in front of us.

few words about what was to be done: take 1 hr to define what see.

write on board what see

(" got here)

definition

similarities

differences

Setting up documentation center

. what do if need a seed?

. classification of data-presented

(all this accompanies seed)

. objective: yours- documentation

to other- get information

. design their own data sheet; to record info. in field + bring it back

charged them with the task of being collectors - just outside the building

with plants readily available - they were to use their own data sheets to record data

. At end of this session presented them with the Izmir sheet proposed by Izmir

Word for word, line by line - went over with them

Explained: This is a set of records

Consider: what happens when seed goes into storage?

what computer is about?

count amt data for one seed

let's see kinds of data come in to data center - How would you account for one

which has 40,000 ^{data pieces} how would you find just one point needed?

if command to start is not given to computer- it stands forever idle (what to do inside - can't be made available?)

IZMIR, TURKEY

April 1974

Recommendations by Rogers concerning work at their Computer Center

That a summary paper on Genetic Resources functions of their center (center) be written and published touching on these items:

1. Holdings at present of seeds - Crop 95 - seeds - Condition of seeds - seeds - seeds - seeds
2. present staff - (Wood 46)
3. Various forms being used for Documentation
4. Materials and methods used

Personnel : Ayla + Nedret are setting up Evaluation of Genetic Resources Data Banks using (P) Crop - Triticum

1. Rast resistance data bank (IntraNat'l rules)
2. Protein analysis bank
3. Data bank of files (for what purpose)

TRAINING COURSE IN DOCUMENTATION AND EXPLORATION OF PLANT

GENETIC RESOURCES

Location : Ege Bölge Ziraat Araştırma Enstitüsü

Duration : 14.5-28.5.1974

Tuesday, 14.5.1974

9.30 Welcome address Dr. T. Atay, Director E.B.Z.A.E.
10.00 Documentation Prof. D. Rogers (FAO)
12.00 Lunch
13.00-17.00 Documentation. (cont.)

Wednesday, 15.5.1974

09.00 - 17.00 Documentation (cont.)

Thursday, 16.5.1974

09.00 - 17.00 Documentation (cont.)

Friday, 17.5.1974

09.00 - 17.00 Preparations for Field trip including herbarium studies of crops to be collected and their wild relatives, discussions of sampling techniques etc.

Saturday, 18.5.1974
09.00 - 13.00 Dr. E. Kjellqvist, Miss A. Sencer

Sunday, 19.5.1974

till Field trip towards Kuşadası, Söke, Milas
Wednesday, 22.5.1974 Dr. E. Kjellqvist, Miss A. Sencer

Thursday, 23.5.1974

09.00 - 12.00 Organizing collected material and records
13.00 - 17.00 Data processing Mrs. N. Settar

Friday, 24.5.1974

09.00 - 17.00 Seed preparation work, including demonstration of seed threshers, cleaners, blowers, seed moisture testers etc. Mr. K. Alpman

Saturday, 25.5.1974

09.00 - 12.30 Final discussions
Dr. E. Kjellqvist
12.30 - 13.00 Closing of workshop
Dr. T. Atay, Director E.B.Z.A.E.

IBM System/360 Model 20
Installation Manual -
Physical Planning
Order No GA 26-5896-9

2020 Processing Units
Submodel B

Configuration = 16K

2 Disk Drives = 2311
Model 12

Printer 2203

FUTURE System

IBM 370 MODEL 115

Configuration at
the Cotton Mill -
Izmir.

Agricultural Research and
Introduction Centre
P.O.B. 9, Menemen
Izmir, Turkey.

TF-REM - 5/ 60

13/4/1974

Dear Dave,

I hope the following information will be sufficient for you to evaluate the costs of the computer services at the cotton mill. The figures I got from Uğur a few months ago but they still stand.

IBM cards required

1- For Coll. Records	30.000
2- " Storage "	20.000
3- " Evaluation Rec.	15.000

65.000

=====

R) 100000 IBM cards	5.000
- Processing storage labels	2.000
- Computer printing	500
- Disks (rental)	540
(2 disks will be loaded)	
- Computer time	9.000
- Labels (15000) for herbarium	
1 Line= 0.08 TL.	
Total 10 lines on each	12.000
- Programming costs	2.000

31.040

=====

With best personal regards to Conny and yourself,

Yours,



Ebbe Kjellqvist

Pakistan

quite a few ag stations (institutes) + 1 ag univ.

Council of Research-

Natl Res. Center-

Establ. GRC-

Screening programs in wheat + corn -
Rice particularly imp in Pak.

Specialists do their own documenting of
ea. crop -

Rice eval. has documentation -

Dis

Insect

Water to toxic

Salinity

Zinc def.

Temp. tolerance

Long grain is imp. int. - higher price -
IRRI can't produce - but working
on "

Call. in the ~~the~~ North - irrigation not
in the N. very cold -

1500 strains selected -

Classification of strains into groups -

Pulses - U. Agr. Lahore

6000 Collectives - poor storage 2-3 yrs

replant

Blight resistance - low yield

F flora of W. Pakistan -

See Wen. of Br. Legum. in W. Pakistan

PL 280 Project -

U. Agric., Lyallpur, Pab.

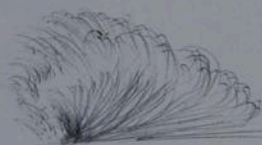
Rice - Coll. of Rice Germ Plasm
and Eval. in W. Pakistan -
1st Ann. Rept.

Dr. Imtiaz Husain

Agr. Res. Council

Govt of Pab.

Karachi -



Documentation is a need -

Syria - main wheat area in N. and in S.W.

S.W. - main durum

Mexican short straw in the N.

Res. in Damascus not -

See on GRC - in the Agr. Res. Centre -

Main crops - wheat, durum, v. alger,

Desire to have GRC program, but nothing now -

1

Agricultural Research and
Introduction Centre
P. O. Box 9, Menemen
Izmir, Turkey

1 September 1973
TUR/8-423

Dear Dave,

Please find enclosed a copy of the revised version of
COLLECTION RECORD and the MORPHOLOGICAL DESCRIPTORS FOR TRIBE
HORDEEAE. A copy of the STORAGE RECORD will have to wait
until Nedret is back.

As you will notice your name does not appear on the form
prepared by Ayla. This is exclusively due to tactical reasons,
which I would prefer to explain to you orally at the earliest
opportunity. However, as soon as Ayla has tried the form with
various genera within the tribe, she wants the three of us
to write a paper in which you would present the usage of the
form by means of computer. She is, at the moment busy
transferring the field data on to the forms. As soon as this
is done, she will try it on herbarium specimens and type
descriptors already available. We believe slight changes
will be necessary, mainly with regards to the terminology.
We have used the new COLLECTION RECORD this summer. We
find it quite satisfactory and practical. Very few changes,
particularly pertaining to the printing, will be needed when
it will be printed *again*.

With best personal regards, also from Ayla and Nedret.

Sincerely,

Ebbe

Dr. EBBE KJELLQVIST
Project Liaison Officer

Prof. D. J. Rogers
Taximetrics Laboratory
Department EPO Biology
University of Colorado
Boulder, Colorado 80302
U.S.A.

*I am taking copies along
to Cairo H. Jorge. Nedret
has come today and wants
along some "cards" for you
which has happened to
H. Jorge?*

EK/ct

10.8.1973

DESCRIPTORS AND DESCRIPTOR STATES OF

COLLECTION RECORDS 1972

1. ACCESSION NUMBER
2. COLLECTION NUMBER
3. COLLECTOR'S INITIALS
4. DAY
5. MONTH
6. YEAR
7. SITE
8. SAMPLE
9. FAMILY
10. GENUS
11. AUTH
12. SPECIES
13. 1.AUTH
14. 2.AUTH
15. SSP. OR BOT. VAR.
16. 1.AUTH
17. 2.AUTH
18. LOCAL NAME
19. SAMPLE
20. HERBARIUM
21. ABUNDANCE
22. SEASON, GROWTH INITIATION
23. SEASON, MATURATION
24. SOURCE
25. COUNTRY
26. ORGANIZATION
27. YEAR

28. COLLECTOR
29. LATITUDE
30. LONGITUDE
31. ALTITUDE
32. ASPECT
33. SLOPE
34. COUNTRY
35. PROVINCE
36. PLACE
37. KM
38. DIR.
39. OTHER INFORMATION
40. PHYSIOGRAPHY
41. LAND FORM
42. SOIL CLASS
43. DEPTH, A HORIZON
44. PROFILE DEPTH
45. STONINESS
46. ROCKS
47. DRAINAGE
48. PH
49. SALINITY
50. SOIL COLOR
51. COLOR COMPOSITION
52. DISTURBANCE FACTORS, INTENSITY
53. FACTORS
54. CLIMATE TYPE
55. NATURAL VEGETATION TYPE, PYCNIA
56. NATURAL VEGETATION TYPE, CANY
57. PLANT COMMUNITY

PLANT GENETIC RESOURCES CENTRE
İZMİR — TURKEY

COLLECTION RECORD

ACCESSION NUMBER _____ COLLECTION NUMBER _____
COLLECTOR (S) _____
LOCALITY _____
COUNTRY _____
PROVINCE _____
PRECISE LOCALITY _____

ALTITUDE _____ ASPECT _____ LATITUDE _____ LONGITUDE _____

IDENTIFICATION

FAMILY _____
GENUS _____ AUTH. _____
SP. _____ 1. AUTH. _____ 2. AUTH. _____
SSP. _____ 1. AUTH. _____ 2. AUTH. _____
VAR. OR GROUP _____ 1. AUTH. _____ 2. AUTH. _____
LOCAL NAME _____

NATURE OF COLLECTION

SAMPLE	KIND OF HER.		
1. SEED B-POP	SPECIMENS	1. SINGLE SPECIES	PHOTOGRAPH
3. SEED N-POP	1. ROOT	2. MIXED COLLECTION	1. HAB. COL.
3. SEED U-POP	2. STEM		2. HAB. B.W.
4. POLLEN B-POP	3. LEAF		3. CLOSE-UP COL.
5. POLLEN N-POP	4. FLOWER	ORIGIN OF HERBARIUM	4. CLOSE-UP B.W.
6. POLLEN U-POP	5. FRUIT	SPECIMENS	
7. VEG. B-POP	6. SEED	1. ORIGINAL	
8. VEG. N-POP	7. ALL	2. CULTIVATED	
9. VEG. U-POP	8. PRESENT		

HABITAT OR SOURCE

PRIMARY HABITAT	SECONDARY HABITAT	OTHER SOURCE
1. BROADLEAF EVERGREEN	1. CULTIVATED LAND	1. MARKET
2. BROADLEAF DECIDUOUS	2. FIELD BORDER	2. FARM STORAGE
3. NEEDLELEAF EVERGREEN	3. ROADSIDE	3. EX. STATION
4. NEEDLELEAF DECIDUOUS	4. WASTE	4. O. SPECIFY
5. MIXED FOREST	5. O., SPECIFY	
6. GRASS		
7. HERB. PLS. OTHER THAN GR.		
8. O., SPECIFY		

ADDITIONAL DATA

MORPHOLOGICAL DESCRIPTORS FOR TRIBE HORDEEAE

PREPARED BY: H. AYLÄ SENCER AND DR. EBBE KJELLQVIST

ACCESSION NUMBER			POPULATION NUMBER		PLANT NUMBER
GENUS NAME	GENUS AUTHOR.	SPECIES NAME	SP.FIRST AUTHOR.	SP.SECOND AUTHOR.	
SSP. NAME	SSP.FIRST AUTHOR	SSP. SECOND AUTHOR.	VARIETY NAME	VAR.FIRST AUTHOR.	VAR.SECOND AUTHOR.
DURATION	FL.TIME-MONTH	FL. TIME-DAY	ROOT		
1. ANNUAL			1. FIBROUS		
2. BIENNIAL			2. RHIZOMATOUS		
3. PERENNIAL			3.		
			4.		
			5.		
STEM DIRECTION	STEM SURFACE	STEM SURF. BEL. INF.	STEM COLOUR BM	STEM COLOUR AM	
1. ERECT	1. PUBESCENT	1. GLABROUS	1. GREEN	1. YELLOW	8. YELLOW-VIOLET
2. DIFFUSE	2. PUBESCENT-SCAB.	2. SCABROUS	2. VIOLET	2. RED	9. YELLOW-BROWN
3. DECUMBENT	3. SCABROUS	3. PUBESCENT	3. VARIABLE	3. VIOLET	10. YELLOW-BLACK
4. PROCUMBENT	4. GLABROUS	4. VARIABLE		4. BROWN	11. YELLOW-GREY
5. VARIABLE	5. GLABROUS-GLAUC.			5. BLACK	12. RED-VIOLET
	6. GLAUCCUS			6. GREY	13. RED-BROWN
	7. VARIABLE			7. VARIABLE	14. RED-BLACK
					15. RED-GREY
STEM HEIGHT(CM)	NUMBER OF TILLERS	NODE SHAPE	NODE SURFACE	NODE COL. BM	NODE COL. AM
		1. CONVEX	1. GLABROUS	1. GREEN	1. YELLOW
		2. CYLINDRICAL	2. PUBESCENT	2. VIOLET	2. VIOLET
STEM THICKNESS(MM)	NUMBER OF NODES	3. CONCAVE	3. VARIABLE	3. VARIABLE	3. BROWN
					4. BLACK
					5. VARIABLE

DESCRIPTORS OF STORAGE RECORDS

1. ACCESSION NUMBER
2. GENUS
3. SPECIES
4. SSP. & VAR.
5. GEOGRAPHIC ORIGIN (COUNTRY)
6. ROOM NO.
7. BLOCK NO.
8. PARCEL NO.
9. DRAWER NO.
10. BOX NO.
11. EXCESS STORAGE ROOM NO.
12. EXCESS STORAGE BLOCK NO.
13. EXCESS STORAGE PARCEL NO.
14. EXCESS STORAGE DRAWER NO.
15. EXCESS STORAGE BOX NO.
16. REJUVENATION DAY
17. REJUVENATION MONTH
18. REJUVENATION YEAR
19. REJUVENATION ORGANIZATION
20. REJUVENATION COUNTRY
21. REJUVENATION PROVINCE
22. GENERATIONS FROM BASE COLLECTION
23. QUANTITY--INITIAL
24. QUANTITY REMAINING AFTER DISTRIBUTION
25. NECESSARY MINIMUM QUANTITY FOR DISTRIBUTION
26. STORAGE MOISTURE CONTENT

27. DAY OF GERMINATION TEST

28. MONTH OF GERMINATION TEST

29. YEAR OF GERMINATION TEST

30. GERMINATION PERCENT

ACCESSION UN
NUMBER 10033985 COLLECTION NUMBER
TEAM ASIS0772 NUMBER 06103
(OFFICE USE) CODE NUMBER CODE DAY MO YR SITE SAMPLE
FAMILY GRAMINEAE GENUS TRITICUM
SPECIES Triticum L. EMEND. BOWDEN
SSP. OR BOT. VAR. DURUM
LOCAL NAME

COLLECTION
SAMPLE HERBARIUM ABUNDANCE SEASON SOURCE
1 SEED N-POP 1 SEED 1 V. SCARCE 1 NAT. HABITAT
2 SEED B-POP 2 POLLEN 2 SCARCE 2 ROAD SIDE
3 SEED U-POP 3 VEG 3 INFREQUENT 3 FARM STORAGE
4 POLLEN N-POP 4 FLOWERS 4 FREQUENT 4 MARKET
5 POLLEN B-POP 5 PHOTO 5 V. FREQUENT 5 EXPER. STATION
6 POLLEN U-POP 6 SOLID STAND 6 "WASTE" LAND
7 VEG N-POP MATURATION 7 CULTIV. LAND
8 VEG B-POP MO 8 OTHER
9 VEG U-POP

EXPEDITION TEAM
COUNTRY TUR ORGANIZATION ARIZC YEAR 72 COLLECTOR HAS, ENCEB

SITE DESCRIPTION
LATITUDE LONGITUDE ALTITUDE ASPECT SLOPE
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100
DEGREES MIN. DEGREES MIN. METERS DEGREES DEGREES

SITE LOCATION
COUNTRY TUR PROVINCE IZMIR
PLACE BERGAMA KM DIR
KURFALIL VILLAGE

OTHER INFORMATION (ADDITIONAL DATA, NOTABLE PATHOGENS AND PESTS OF/IN VICINITY OF COLLECTED SPECIES)

TOPOGRAPHY

PHYSIOGRAPHY

- 0 DEPRESSION
- 1 VALLEY BOTTOM
- 2 VALLEY SIDE
- 3 PLAIN
- 4 TERRACE
- 5 PLATEAU

- 6 CONVEX SLOPE
- 7 CREST
- 8 SUMMIT
- 9 OTHER, SPECIFY

LAND FORM

- 0 FLAT
- 1 UNDULATING
- 2 ROLLING
- 3 HILLY
- 4 HILLY DISSECTED
- 5 STEEPLY DISSECTED

- 6 MOUNTAINOUS
- 7 OTHER, SPECIFY

SOIL DESCRIPTION

TEXTURAL CLASS

- 1 SAND, LOAMY SAND
- 2 SANDY LOAM
- 3 LOAM, SILT LOAM
- 4 CLAY LOAM
- 5 CLAY, SILTY CLAY
- 6 HIGH ORGANIC

DEPTH

- 1 < 10 cm
- 2 10 - 30 cm
- 3 > 30 cm

PROFILE DEPTH

- 1 SHALLOW < 0.5 M
- 2 MEDIUM > 0.5 - 2 M
- 3 DEEP > 2 M

STONINESS

- 0 NO STONES
- 1 FEW STONES
- 2 FAIRLY STONY
- 3 STONY
- 4 VERY STONY
- 5 EXCEEDINGLY STONY
- 6 ESSENTIALLY PAVED

ROCKS

- 0 NONE
- 1 FEW
- 2 FREQUENT
- 3 MANY
- 4 VERY MANY

DRAINAGE

- 1 POOR
- 2 MODERATE
- 3 WELL DRAINED
- 4 EXCESSIVELY DRAINED

pH

- 1 VERY LOW (< 4.0)
- 2 LOW (4.0 - 5.5)
- 3 MEDIUM (5.5 - 7.5)
- 4 HIGH (7.5 - 9.0)
- 5 VERY HIGH (> 9.0)

SALINITY

- 0 NONE
- 1 LOW
- 2 MEDIUM
- 3 HIGH

COLOR, INTENSITY

- 0 V LIGHT
- 1 LIGHT
- 2 MEDIUM
- 3 MED LIGHT
- 4 DARK
- 5 V DARK

COLOR, COMPOSITION

- 0 YELLOW
- 1 ORANGE
- 2 RED
- 3 BROWN
- 4 BLACK
- 5 GREY
- 6 OLIVE
- 7 BLUE
- 8 OTHER, SPECIFY

DISTURBANCE FACTORS

CODE

- 1 MARGINAL
- 2 LOW
- 3 MEDIUM
- 4 INTENSE
- 5 UNKNOWN
- 6 WIND EROSION
- 7 WATER EROSION
- 8 FLOODING
- 9 DRAINAGE
- 10 IRRIGATION
- 11 FIRE
- 12 GRAZING
- 13 CUTTING
- 14 FALLOW
- 15 CULTIVATION
- 16 ABANDONED
- 17 FERTILIZER - CHEMICAL
- 18 FERTILIZER - ORGANIC
- 19 HERBICIDES
- 20 OTHER, SPECIFY

CLIMATE AND VEGETATION TYPE - SURROUNDING AREA

CLIMATE TYPE

- 1 FORMULA
- 2 NAME

NATURAL VEGETATION TYPE

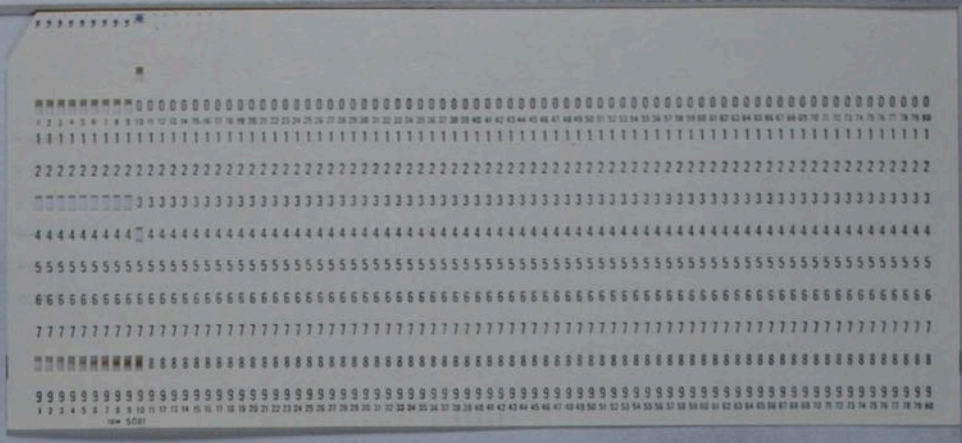
- 1 FORMULA
- 2 NAME

PLANT COMMUNITY

GENUS

- S
- T
- E
- A
- R
- E
- A
- D
- J
- A

SPECIES



ACCESSION UN NUMBER		COLLECTION NUMBER	
1		TEAM	
2		NUMBER	
(OFFICE USE) 3		4	
5		6	
CODE NUMBER		CODE DAY MO YR	
7		SITE SAMPLE	
FAMILY		GENUS	
8		9	
SPECIES			
10		11	
SSP OR BOT. VAR.			
12		13	
LOCAL NAME			
14		15	
COLLECTION			
SAMPLE		HERBARIUM ABUNDANCE	
16		17	
18		19	
20		21	
22		23	
24		25	
26		27	
28		29	
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36		37	
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TOPOGRAPHY

PHYSIOGRAPHY

- 1 DEPRESSION
- 2 VALLEY BOTTOM
- 3 VALLEY SIDE
- 4 PLAIN
- 5 TERRACE
- 6 PLATEAU
- 6 CONVEX SLOPE
- 7 CREST
- 8 SUMMIT
- 9 OTHER, SPECIFY _____

LAND FORM

- 0 FLAT
- 1 UNDULATING
- 2 ROLLING
- 3 HILLY
- 4 HILLY DISSECTED
- 5 STEEPLY DISSECTED
- 6 MOUNTAINOUS
- 7 OTHER, SPECIFY _____

SOIL DESCRIPTION

- | | | |
|--------------------|------------|-------------------|
| TEXTURAL CLASS | DEPTH 'A' | PROFILE DEPTH |
| 1 SAND, LOAMY SAND | 1 < 10 cm | 1 SHALLOW < 0.5 M |
| 2 SANDY LOAM | 2 10-30 cm | 2 MEDIUM > 0.5-2M |
| 3 LOAM, SILT LOAM | 3 > 30 cm | 3 DEEP > 2M |
| 4 CLAY LOAM | | |
| 5 CLAY, SILTY CLAY | | |
| 6 HIGH ORGANIC | | |

STONINESS

- 0 NO STONES
- 1 FEW STONES
- 2 FAIRLY STONY
- 3 STONY
- 4 VERY STONY
- 5 EXCEEDINGLY STONY
- 6 ESSENTIALLY PAVED

ROCKS

- 0 NONE
- 1 FEW
- 2 FREQUENT
- 3 MANY
- 4 VERY MANY

DRAINAGE

- 1 POOR
- 2 MODERATE
- 3 WELL DRAINED
- 4 EXCESSIVELY DRAINED

pH

- 1 VERY LOW (< 4.0)
- 2 LOW (4.0-5.5)
- 3 MEDIUM (5.5-7.5)
- 4 HIGH (7.5-9.0)
- 5 VERY HIGH (> 9.0)

SALINITY

- 0 NONE
- 1 LOW
- 2 MEDIUM
- 3 HIGH

COLOR, INTENSITY

- 0 V LIGHT
- 1 LIGHT
- 2 MEDIUM
- 3 MED LIGHT
- 4 DARK
- 5 V DARK

COLOR, COMPOSITION

- 0 YELLOW
- 1 ORANGE
- 2 RED
- 3 BROWN
- 4 BLACK
- 5 GREY
- 6 OLIVE
- 7 BLUE
- 8 OTHER, SPECIFY _____

DISTURBANCE FACTORS

- | | | | | | | | | | | | | | | | | | | | | | | |
|------|------------|-------|----------|-----------|-----------|-------------|----------------|-----------------|------------|-------------|---------------|---------|------------|------------|--------------|-----------|----------------|--------------|--------------------------|-------------------------|---------------|-------------------------|
| CODE | 1 MARGINAL | 2 LOW | 3 MEDIUM | 4 INTENSE | 5 UNKNOWN | 6 1,2,3,4,5 | 7 WIND EROSION | 8 WATER EROSION | 9 FLOODING | 10 DRAINAGE | 11 IRRIGATION | 12 FIRE | 13 GRAZING | 14 CUTTING | 15 1,2,3,4,5 | 16 FALLOW | 17 CULTIVATION | 18 ABANDONED | 19 FERTILIZER - CHEMICAL | 20 FERTILIZER - ORGANIC | 21 HERBICIDES | 22 OTHER, SPECIFY _____ |
|------|------------|-------|----------|-----------|-----------|-------------|----------------|-----------------|------------|-------------|---------------|---------|------------|------------|--------------|-----------|----------------|--------------|--------------------------|-------------------------|---------------|-------------------------|

CLIMATE AND VEGETATION TYPE - SURROUNDING AREA

- | | |
|--------------|-------------------------|
| CLIMATE TYPE | NATURAL VEGETATION TYPE |
| 1 FORMULA | 2 FORMULA |
| 3 NAME | 4 NAME |

PLANT COMMUNITY

- | | |
|-------|---------|
| GENUS | SPECIES |
| S | |
| I | |
| T | |
| E | |
| A | |
| R | |
| E | |
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1st, Sept., 1973

Dear Dr. Rogers,

I am very hurry in writing since I would like to add few lines to the letter of Dr. Kjellqvist.

We have already started to punch with 1972 Collection Records. I hope it will be useful to send you set of cards for two different collections. I also added original record forms and Descriptor List of 1972 for easy following.

It will be very much appreciated for me to receive your ideas and commands.

With my best regards and thanks.

Nedret Settar
Settar

[illegible]

ACCESSION NUMBER

COLLECTION NUMBER

COLLECTOR(S)

LOCALITY

COUNTRY

PROVINCE

PRECISE LOCALITY

ALTITUDE

ASPECT

LATITUDE

LONGITUDE

IDENTIFICATION

FAMILY

GENUS

SPECIES

SUBSP., VAR., GROUP

LOCAL NAME

NATURE OF COLLECTION

SAMPLE	KIND OF HERBARIUM SPECIMEN	1 SINGLE SPECIES 2 MIXED COLLECTION	PHOTOGRAPH
1. SEED B-POP	1. ROOT	Add DESCRIPTOR ORIGIN OF HERBARIUM SPECIMEN 1. Collected at original habitat 2. Collected from plants raised at ARIC or other experiment station.	1. HAB. COLOUR
2. SEED N-POP	2. STEM		2. HAB. BW
3. SEED U-POP	3. LEAF		3. CLOSE-UP COL.
4. POLLEN B-POP	4. FLOWER		4. CLOSE-UP BW
5. POLLEN N-POP	5. FRUIT		
6. POLLEN U-POP	6. SEED		
7. VEG. B-POP	7. ALL		
8. VEG. N-POP	8. Present.		
9. VEG. U-POP			

HABITAT OR SOURCE

PRIMARY HABITAT

SECONDARY HABITAT

OTHER SOURCE

1. BROADLEAF EVERGREEN
2. BROADLEAF DECIDUOUS
3. NEEDLELEAF EVERGREEN
4. NEEDLELEAF DECIDUOUS
5. GRASS
6. HERB. PLS. OTHER THAN GR.
7. OTHER, SPECIFY

1. CULTIVATED LAND
2. FIELD BORDER
3. ROADSIDE
4. WASTE
5. OTHER, SPECIFY

1. MARKET
2. FARM STORAGE
3. EX. STATION
4. OTHER, SPECIFY

ADDITIONAL DATA

DISTURBANCE FACTORS

- | | |
|------------------|--------------------|
| 1. WIND EROSION | 6. FIRE |
| 2. WATER EROSION | 7. CRAZING |
| 3. FLOODING | 8. CUTTING |
| 4. DRAINAGE | 9. CULTIVATION |
| 5. IRRIGATION | 10. OTHER, SPECIFY |

TOPOGRAPHY

PHYSIOGRAPHY

LAND FORM

VALLEY
PLAIN
PLATEAU
SUMMIT
O., SPECIFY

FLAT
HILLY
MOUNTAINOUS
O., SPECIFY

SOIL

SOIL CLASS

SOIL STONINESS

GRAVEL
SAND
SANDY LOAM
LOAM
LOAMY SILT
SILT
SILTY CLAY
CLAY
ORGANIC

FEW STONES
STONY
VERY STONY
ESSENTIALLY PAVED

SOIL DRAINAGE

SOIL pH

SOIL SALINITY

POOR
MODERATE
WELL DRAINED
EXCESSIVELY DRAINED

SOIL COLOUR ; color-composition

INTENSITY
LIGHT
MEDIUM
DARK

YELLOW
ORANGE
RED
BROWN
BLACK
GREY
OLIVE
BLUE
O., SPECIFY

ASSOCIATED WILD SPECIES OR CROPS

GENUS

SPECIES

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RJP/amsd
5.4.74.

cc: Kjellqvist, Izmir
de Jong, DDFS
de Fauconval, AGON
Sykes
Rogers
chronoc: Pichel
Sec.
AGP Reg. (2)

CP-4/1(REM/5(SWE)

8 APR 1974

Dear Chris,

I hope that by now you will have received a letter from Andrew Joseph giving you general guidelines for your discussions with the Ministry of Agriculture regarding both the "autonomous" status of the Regional Project and the candidature of Dr. Kjellqvist for the post of Project Coordinator.

I understand that the Swedish Government Representative and the SIDA Representative stopped over in Ankara for further discussions with the Ministry of Foreign Affairs (and State Planning Organisation). These discussions might have related to the location of the Regional Project Headquarters (Regional Research Institute for Ege University).

I shall, of course, very much appreciate being kept informed of any new developments in this connection.

May I now request your kind assistance in the following two matters:

- (1) To obtain the names of the two Turkish specialists who will be involved in the two-week workshop to be held in Izmir, starting 14 May 1974. One of the two should be a "plant explorer" and the other should deal with genetic documentation.

The first three days of the workshop will be devoted to training in documentation (with Dr. D.J. Rogers) and the remaining period to plant exploration techniques with Kjellqvist.

If the Government agrees to designate more than one man for plant exploration, this will, of course, be welcome.

I know that Kjellqvist has already trained Turkish personnel in plant exploration, and that some of them may be able to help him in training the fellows who will come from the other cooperating countries, but Turkey may like to take this opportunity to provide training to additional people.

..../..

Mr. C. Beringer,
Senior Agricultural Adviser/FAO Country
Representative,

c/o UNDP,
P.O. 407,
ANKARA,
Turkey

- (ii) To obtain the nomination of a fellow to attend the MSc. Course in Birmingham on Plant Genetic Resources Conservation and Utilization (with Prof. J. Hawkes).

The number of fellows which the University can accommodate is strictly limited and there is an urgent need to inform Prof. Hawkes as to how many of them will be ready to start in September 1974.

As soon as we have the answer to (i) - preferably by cable - we can then proceed with the administrative procedures for sending funds to Kjellqvist for the local payment of per diem.

Thank you very much for your kind cooperation in this matter.

With warmest personal regards,

Yours sincerely,

R.J. Pichel
Chief, Crop Ecology and Genetic Resources Unit
Plant Production and Protection Division

(Dictated before leaving on a duty trip
to Germany)

RJP/amsd
5.4.74.

cc: Beringer, SAA, Ankara
de Fauconval, AGON
Rogers
chrono: Fichel
Sec.
AGP Reg. (2)

REM/5(SWE)-GP-4/1

- 8 APR 1974

Dear Ebbe,

With reference to Olaf's letter of 26 March 1974, I wish to inform you about the following:

- (i) I have prepared letter to all the Senior Agricultural Advisers of the cooperating countries requesting them to expedite the designation of the two representatives for the two-week workshop in Izmir (first three days on genetic documentation and the remaining period to be devoted to field training in exploration techniques).
- (ii) Please send us as soon as possible the final copies of the revised Project Document (*), Basic Agreement for the establishment of the Regional Project, and the Statutes of the Board (*). These are required for discussion with SIDA.
- (iii) I am still waiting for the curriculum vitae of the Turkish staff to be locally recruited by FAO in support of the Regional Project.
- (iv) I have also requested the Senior Agricultural Advisers of the cooperating countries to send me the nominations for the fellows to be sent to Birmingham (MSc. Course with Prof. Hawkes).
- (v) For administrative reasons, the workshop cannot be held from 6 May and I have decided to postpone it to 14 May 1974. This will give us more time to obtain the nominations of the participants, prepare ~~the~~ to send pre-paid tickets to the various UNDP Offices, and give you the Budget clearance for local payment of per diem to the participants.

The workshop should start with three days' training in documentation (with Dave Rogers), followed by your training in plant exploration techniques.

Dr. E. Kjellqvist,
Agricultural Research and
Introduction Centre,
P.O. Box 9,
Menemen,
IZMIR,
Turkey.

..//..

- (*) Since writing, one copy of each of these have been received via Mr. Beringer's letter to Mr. Joseph,

(vi) The problem of recruitment of your Secretary has been resolved and by now Mr. Beringer should have received authorization to put her on the payroll of the Project (until June 1974).

With best personal regards,

Yours sincerely,

R.J. Pichel
Chief, Crop Ecology and Genetic Resources Unit
Plant Production and Protection Division

PS: Please keep me informed about the results of discussions between the Swedish Government and SIDA Representatives with the Government Authorities, if you participated in these discussions in Ankara. I have also asked Chris Beringer to report to me on this as soon as possible.

RJP/amsd
6.3.74.

cc: Albani, AGPD
Heppling, UNDP/Turkey
El Midani, AGON Havsteen, AGON
de Fauconval, AGON
Bildesheim, REUR
Rogers, AGPE Kjellqvist, }
Tahir, AGPC Izmir, Turkey. }
chrono: Pichel
Sec.
AGP Reg. (2)

GP-4/1(REM/5/SWS)

Dear Mr. Beringer,

I wish to advise you that Dr. D.J. Rogers, Mr. O. Havsteen and I will be paying a visit to Izmir, arriving 17 March 1974, by flight No. TK-922 at 16.45 hours.

The purpose of my visit is to represent the Director-General of FAO at the first meeting of the Managing Board for the SIDA Regional Project, REM/5(SWE) "Exploration and Conservation of Plant Germplasm in the Near East" and to finalise the action programme for the next exploration campaigns.

Dr. D.J. Rogers, who is our Consultant in Genetic Resources Documentation, will present a lecture at the Managing Board meeting and will be remaining in Izmir for a few days after the meeting is finished in order to carry out preparatory work in the Documentation Centre.

Mr. M. El Midani, Chief of the Europe, North Africa and Near East Service of the newly formed Agricultural Operations Division (AGO), has very kindly agreed to the secondment to Izmir of Mr. Havsteen, who is a Country Project Officer in his Service. Mr. Havsteen will stay for one month to assist the Project Coordinator, Dr. Kjellqvist, in preparing the detailed programme of activities and assist in ordering the equipment which will be required in this Regional Project.

I shall be grateful if your office could make the necessary arrangements for us with regard to accommodation (I would personally prefer to be booked in at the Ephesus Hotel). I shall be returning to Rome by flight No. TK-321 at 12.15 hours on Saturday, 23 March. Dr. Rogers, who will be accompanied by his wife, will be returning by flight No. TK-309 at 09.15 hours on Wednesday, 27 March. Mr. Havsteen, in the first instance, will require accommodation for one week only; subsequently, he will make his own arrangements for the rest of his stay in Izmir.

With best personal regards,

Yours sincerely,

R.J. Pichel
Chief
Crop Ecology and Genetic Resources Unit
Plant Production and Protection Division

Mr. C. Beringer,
Senior Agricultural Adviser/
FAO Country Representative,
c/o UNDP, P.O. Box 407,
ANKARA, Turkey.

J. H. H.

Monday morning 25/3/1974.

A further visit to the Computing Service Centre was made by Prof. D. Rogers, Mrs. Rogers, Mr. Havsteen, Dr. Kjellqvist, Miss Ayla Sencer and Mrs. Nedret Settar.

Discussions were held on :

Programming to edit the data and the two aspects to this.

Clarification of the data to the staff at Menemen.

General discussion to the organization of the documentation systems and it was pointed out by Prof. Rogers that competent staff at PAO is needed to coordinate all the functions both from the aspects of data and computing to provide the services for the Near East Genetic Resources Centre and for all the other similar Centres all over the world.

Prof. Rogers presented a paper on the Introduction and Background and the Programming and production jobs to be performed. Copy of this paper was kept with the computing centre and Mrs. Nedret Settar.

Rogers

Wednesday morning 20/3/74

Visit to I.P.M. (İsmir Pamuk Mensucat) at the Computing Service Centre by Prof. D. Rogers and Mr. O. Havsteen
People contacted : Mr. Herve Girard, Mr. Uğur Yüce and Mr. T. Pekman.

Discussions were held on :

- a) The past activities with relation to data processing and the possible future role of the Near East Genetic Resources Project in relation to this company, which already has provide some assistance.
- b) The Taxir system which is intended to channel the Global Network of the many Genetic Resource Centres being established and FAO's role in co-ordinating these activities.
- c) The need for a users manual for Taxir on the documentation of the Information / Retrieval system. So that uniform documentation of the computer system can be developed.
Reference was also made to Annex No: ...
- d) Problems from the key punching stage to the magnetic tape, the bottle necks of data processing of which one is peoples lack of questioning things they do not understand in this important field.

Confirmation was given by the company that the Regional Documentation Specialist was welcome (free of charge) for a 10 days briefing on the data processing. It was agreed that a further visit should be made on Monday 25/3 to discuss among other things the possibility of arranging a contract for the rent of the Computer Services.

Wednesday Afternoon

The delegates and other participants visited Ege University-Bornova just outside İsmir where the group was received by the Rector, Prof. Dr. Yusuf Vardar, who explained the many faculty activities of the University.

The Faculty of Agriculture has 5 year courses which leads to a Diploma in Higher Agricultural Engineering. The students gain also practical experience by working for a semester on the 300 ha University farm. The last two semesters students can specialize themselves in the following fields : Agronomy, Food and Fermentation Technology, Agricultural Engineering, Soil Science.

It is worth mentioning that there are 100 times as many students now as compared with 50 years ago. In the same period the population of Turkey has approximately grown from 10-40 million inhabitants.

A short visit was also paid to the 5 year old Botanical Garden at Bornova.

Prof. D. Rogers

Prof. Rogers informed the audience that statistics show that scientists spend on the average 30-60 % of their ~~time~~ on documentation, and continued with the following points :

1. Definition of documentation in a Genetic Resources Centre (GRC) really means communication.

a. All the data/information about all the collections of Genetic Resources.

Examples : Collection, quarantine, storage, utilization.

b. All activities produce some data.

2. How much data ?

a. For each seed collection there is as many as 100 separate pieces of data. If one only had 100 collections in a G.R.C. $100 \times 100 = 10000$ separate data points. If 10,000 collections 1,000,000 data points etc.

b. Manual techniques to recover any one of the pieces of data for any one collection, is very cumbersome
Time consuming, inaccurate or incomplete.

c. Therefore it is necessary to employ computer^{ing} machines to efficiently accomplish any task.

3. Tasks involved :

Some sample questions -

How many peaches flower in early March through April, in the Bursa region of Turkey ?

A. wheat breeder in Syria wants all *Triticum aestivum* with ^{resistance} visiblance to stem rust from the central Plateau of Turkey.

The director of the Genetic Resources Centre in Afghanistan wants to know where all collections of barley were made over the last 5 years to plan future collecting work.

There are two factors to consider- the computing and the data.

4. Use of computer^{ing} machines :

a. not a very old process- less than 10 years, since the last generation of computery machines were available
Since 1968-1970 when only very good computer programmes have been available for use.

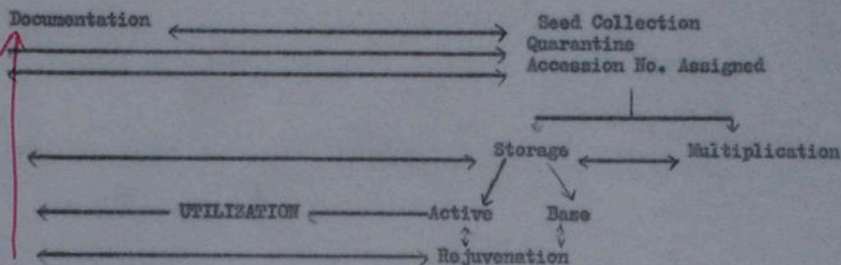
b. complex set of problems to get the machine to do the work necessary.

5. Complexity of genetic resources data

Describing living plants and their products provides most complex set of data of any science in the world. Needs, therefore, best possible expertise. - Training of experts - both in data and in computing machines are very important to guarantee best application.

6. Network to share information between National Genetic Resource Centre + Ismir + rest of the world usually, before one sends actual samples of seeds one asks for information about the seeds. Therefore necessary to set up communication transfer mechanisms network.

In other words the importance of documentation is easily seen from below rough outline of the flow of activities by which the Taxir Information / Retrieval System enormously facilitate the job.



Prof. J. Harlan

The talk which was given to the audience was supported by slides taken from the Near East Region. It was expressed that this area already had received seed collecting expeditions from several countries in the past. However, as time passes further expeditions are necessary or rather very essential, and that these should not be carried out as the previous ones, where one just left the land rover or jeep and took samples within short distances from the vehicles; but one ~~should~~ should reach the more remote sections preferably those where no vehicles could go. This is of course a very time ~~consuming~~ ^{spending} job, but it is in these remote a. one really finds the authentic material. A good ~~sign~~ sign would be if a village never has seen a jeep.

It is thought that Plant exploration activities sometimes would be adequate if one managed 20 miles a day as an average, but left it up to the individual collectors good judgement as to whether one should collect seeds in one valley pr. summer or carry out a larger area in collecting season. However, it was not whether anybody could answer the following questions on : how much time, how many fields and how large a sample a collector should use in a limited area, it would all depend on the material available. Statistics have worked out that samples from 25-30 plants would be adequate pr. collection, but a little less was thought to be sufficient. Some people think that one should collect seeds on a random basis. Prof. Harlan disagreed with this; one should take all kinds one could see, if one collected on the random basis one could miss the rare materials.

Prof. Harlan once had a request to collect plants as high as they occur (walnuts i.e.) here it would be difficult to justify trips on the other side of the valley as this would be of a too time consuming nature. Stress was put on the extreme importance of knowing the crops and their wild relatives, and of getting away from the road to collect the seeds. There are too many highly trained people who will not get out of the car. It is only within the last five years one knows the pea relative in the wild form.

In view of the impossibility of knowing all crops thoroughly, the importance was expressed of having visits of specialists (in ~~few~~ ^{one or two} crops) to the Near East Genetic Resources Project for Plant Exploration Activities.

Furthermore the audience was advised to get on with the job in view the increasing plant genetic erosion.

PROPOSED AGENDA

First Meeting - Near East Genetic Resources Project, Izmir, March 18-22, 19

Monday, 18 March, 10:00

- 1) Welcome address, Ministry of Foreign Affairs
" " Prof. Y. Vardar, Rector, Ege University
- 2) Opening, Dr. A.H. Boerma, Director General FAO or his representative
- 3) Election of President
- 4) Adoption of Agenda
- 5) Signing of Project Agreement

Lunch

Monday, 18 March, 14:00

Chairman, Mr. S. Heppling, UNDP Resident Representative, Ankara

- 6) Establishment of Managing Board
- 7) Approval of Statutes of Managing Board
- 8) Establishment of Scientific Advisory Council
- 9) Approval of Terms of References of Scientific Advisory Council
- 10) Confirmation of Terms of Reference of Project Coordinator and
FAO's nomination for this post

Monday, 18 March, 19:00

Dinner

Tuesday, 19 March,

Chairman : Prof. J.G. Harlan

- 9:30 Activities of a "Genetic Resources Centre" - Dr. E. Kjellqvist
- 10:00 Plant Exploration activities of a Genetic Resources Centre -
Prof. J. Harlan

Coffee Break

- 11:00 Seed Conservation - Prof. L. Kihre
- 11:30 Computerized Documentation in a Genetic Resources Centre -
Prof. D. Rogers
- 12:00 Training of Personnel for Genetic Resources Centre activities -
Prof. J. Hawkes

Lunch

Afternoon

Sightseeing in Izmir.

Wednesday, 20 March

9:00 Visit to the laboratories of the Izmir Genetic Resources Centre

Thursday, 21 March

Chairman: Dr. E. Kjellqvist

Discussion of action programmes for 1974

9:00 Afghanistan

10:00 Iran

11:00 Iraq

Lunch

14:00 Pakistan

15:00 Syria

16:00 Turkey

Friday, 22 March

Chairman: Prof. L. Kåhre

Personnel, research facilities and other requirements for Genetic Resources Activities - *Training Programs*

9:00 Afghanistan

9:30 Iran

10:00 Iraq

Coffee

11:00 Pakistan

11:30 Syria

12:00 Turkey

12:30 Approval of work plan

Closing remarks and official adjournment (including dates and venue of next meeting) - Prof. V. Tayşi

Saturday, 23 March

Visit to Ephesus.

*Intervntl
Instit Organy to SIDA
Denmark then
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Plan of Operation

I. TITLE

Exploration and Conservation of Plant Germplasm in
the Near East

SYMBOL

7/SIDA/35

RECIPIENT COUNTRIES

Afghanistan, Iran, Iraq, Pakistan, Syria and Turkey

NATIONAL MINISTRIES INVOLVED

Ministries of Agriculture

DONOR CONTRIBUTION

US \$ 1,386,000

DURATION

4 1/2 years

II. BACKGROUND

The Problem

The green revolution, while increasing grain harvests considerably in many regions over the past few years, has at the same time brought about a realization among plant breeders that they are rapidly losing the major source of raw materials on which all further work depends. The solution to this problem lies in setting up plant exploration programmes in areas of maximum diversity of our major crop plants and establishing long-term storage facilities for their maintenance.

A project of this nature was established at Izmir, Turkey, between 1964-1969 under a UNDP/SF/FAO project (TUR/8) and has since then continued with further UNDP and Turkish Government support.

At present most gene banks are situated outside the gene centres, which brings certain disadvantages. Regional organizations within the gene centres would permit - as experience at Izmir has shown - co-ordinated exploration activities from year to year in a way that single expeditions from other countries would find impossible. Furthermore, trained local personnel would be able to penetrate to the more remote areas and form permanent contacts with farmers and peasants much more easily than it is possible for scientists from other countries. Additionally, the benefits to the developing countries from participating in an organized, co-ordinated effort would be substantial. Local personnel, trained and utilized in collection and preservation activities in their own countries, would contribute significantly to the screening and utilization of their local material in national plant breeding programmes. (Further information is given in Appendix I).

Related Projects

The project is of direct relevance to national crop improvement programmes as well as other research programmes, presently being carried out in the member countries in the following ways :

- (1) By organizing collection and conservation of the native plant germ plasm and making it available whenever requested;

- (2) By organizing introduction of plant germ plasm collections from other parts of the world as well as improved varieties;
- (3) By stimulating regional co-operation between member countries, particularly for the evaluation and utilization of plant germ plasm collections which is of direct relevance to the development programmes of the countries involved.

Prospects for a truly international effort could be greatly enhanced by international co-operation in establishing the proposed project. The development of the Izmir Centre as a regional facility, serving all or part of three of the eight gene centres delineated by the Russian scientist Vavilov would be a major step towards a global concept. This region is one of the most utilized genetic resources areas in the world, and all efforts would be co-ordinated towards making extensive and valuable collections. Furthermore, a pattern of regional and inter-regional co-operation would have been established.

Governments' Interests and Support

See Annex I, II, III, IV, V and VI.

Documentation

Report by Drs. Harlan and James, December 1970, AGP: SF/TUR 8 Mission Report WS/B4493. The Final Report of TUR/508.

III. PURPOSE

It is the purpose of the present request to extend the scope of the Turkish UNDP/FAO project to countries in the Near East in view of the serious threat to genetic resources in the whole region of almost all cultivated crops.

It is proposed that a regional germ plasm collection and preservation programme should be carried out in the following countries : Afghanistan, Iran, Iraq, Pakistan, Syria and Turkey with the Headquarters of the regional project located in the Agricultural Research and Introduction Centre at Izmir, Turkey.

These countries comprise all or part of three of the eight gene centres described by N.I. Vavilov, the Russian scientist, who half a century ago conducted a world survey and study of our most important crops.

Although an international association may ultimately develop, the importance of a regional association of countries at the present time cannot be too highly stressed. It is neither necessary nor economic to establish permanent gene banks for long-term storage in every country. The feasible solution is to establish regional gene banks to serve a group of countries with similar ecological characteristics. Regional collection and preservation activities, as well as periodical multiplication and rejuvenation of collections must be co-ordinated.

Working collections will be maintained as required in the countries concerned and a complete set of all collections will be maintained under long-term storage at Izmir, Turkey, where the necessary facilities are already available. Also the regional documentation centre will be maintained at Izmir, with a computer-based information storage and retrieval system.

Local personnel will receive initial field training in Turkey, followed by a period of one year at University of Birmingham, U.K., where they will receive theoretical and practical training in "Conservation and Utilization of Plant Genetic Resources". Some regional seminars and workshops will also be arranged.

The projects aims are :

- (i) To carry out a systematic regional plant exploration programme in Afghanistan, Iran, Iraq, Pakistan, Syria and Turkey on a co-operative basis.
- (ii) To provide safe long-term storage of seed and other materials in order to preserve the genetic resources of the countries mentioned, both for their own use and that of the rest of the world in plant breeding.
- (iii) To provide a regional documentation centre at Izmir and national units in the co-operating countries.
- (iv) To provide facilities for short-term storage of working collections and introductions to the co-operating countries.
- (v) To provide a framework for regional co-operation in the evaluation and utilization of the germ plasm material so collected.

Design

(i) Exploration

Beginning in 1974, for a period of five years, field exploration and collection activities would be organized in each of the co-operating countries. The annual field exploration activities would be planned and executed with the assistance of the project co-ordinator. Collections would be made on an area basis and along ecological principles according to priorities set out by the Managing Board.

(ii) Maintenance

The collected material would be processed and all or part forwarded along with collection records and herbarium specimens to the Izmir Centre for long-term storage, final identification and documentation. The co-operating countries would each establish a small germ plasm unit, preferably in the agency responsible for plant introduction.

(iii) Distribution

The combined seed collections would be available to all co-operating countries and the international community on request.

Sub-samples of seed collections would be prepared at Izmir for safe keeping in other gene banks. Simultaneously, the Izmir Centre would be recipient of sub-samples from other regional centres.

(iv) Rejuvenation

For ecological and genetical reasons, it is essential that rejuvenation of seedstock be done on a regional basis. In order to maintain variability or prevent genetic change by selection in an environment to which the original samples were not adapted, they must be rejuvenated (i.e. grown again from seed) in the countries where they were collected and in an environment as close as possible to their original habitats.

(v) Evaluation

It is also desirable that evaluation programmes be carried out on a regional basis so that the genetic potential of the material can be studied satisfactorily under as widely varied environments as possible. The project would provide a framework for such a regional approach.

(vi) Training of Personnel

Co-operating countries would provide two professionals each, who would receive training in exploration, conservation and documentation techniques at Izmir for a six weeks' period. They would then proceed to Birmingham, U.K., for one year's training in "Conservation and Utilization of Plant Genetic Resources". Six fellows (one from each co-operating country) would be sent in 1974-75, and a further six in 1975-76. In addition regional seminars and workshops will be arranged.

Time Schedule of Project Operations

1974 - In order to start collection activities in Afghanistan, Iran, Iraq, Pakistan and Syria, under the leadership of competent domestic professionals as soon as possible, it is essential that practical and theoretical training be provided for people, one from each country, already in 1974.

The Izmir Centre is prepared and ready to provide a practical training course in "Exploration, Conservation and Documentation of Plant Genetic Resources", for such trainees during six weeks, starting 1 August. Furthermore the Botany Department of the Birmingham University, Birmingham U.K., is ready to accept qualified candidates for training in "Conservation and Utilization of Plant Genetic Resources."

1974 - March : First Managing Board meeting to be held at Izmir for approximately one week. The programme of the meeting will be :

- (a) To discuss the different project activities and their implementation in a co-ordinated effort;
- (b) to establish the priorities for field and other project operations.
- (c) to identify the immediate action required both by the Board members and the Executing Agency

-Spring : Survey existing collections in respective countries to get an up-to-date picture of the present situation.

-Summer : Start field operations in the co-operating countries.

Field course in Turkey, for the first lot of trainees.

- Autumn : Second meeting of the Managing Board, the programme of which will be :

- (a) to review the achievement so far;
- (b) to discuss problems encountered during the operations;
- (c) to formulate the next action programme.

1975 - As of 1975 only one annual Managing Board meeting is foreseen, the purpose of which will be :

- (a) to review achievements during the past year
- (b) to determine the action programme for the following year.

VI.(A) WORK PLAN

Location and Phasing of the Project

The Headquarters of the regional project will be in Izmir, Turkey, and it will include Afghanistan, Iran, Iraq, Pakistan and Syria. In each of these countries will be established a national unit which will function in co-operation with the Centre. The phasing of the project will be from 1 January 1974, until 30 June 1978.

(B) SUPPORTING MATERIAL TO THE WORK PLAN

(1) The official to be responsible

Project Co-ordinator in co-operation with the Managing Board of the project.

(2) The nature of personnel, supplies, equipment, fellowships, etc. to be provided

The Project Co-ordinator and the Assistant Project Co-ordinator will have their duty station at the Project Headquarters. The Project Co-ordinator will be responsible : (1) for the co-ordination of the programme between the Centre and the national units in the co-operating countries; (2) he will be actively involved in the technical and scientific matters of the project.

The Assistant Project Co-ordinator will be assisting the Project Co-ordinator in all respects.

In addition, the staff of the regional project headquarters to be provided from the project budget will consist of a senior adviser, a taxonomist, a seed physiologist, a tissue-culture specialist, a tree-fruit specialist, and a rejuvenation specialist. These staff members will be recruited by FAO. The senior adviser will handle the national Turkish programme and serve as leader of the locally recruited team of Turkish specialists.

The Managing Board is formed by two representatives from each co-operating country. They will direct the activities of the project in their respective countries.

The project would be assisted by a Standing Scientific Advisory Group, whose members will be elected by the Managing Board according to the requirements of the project.

The members of the Advisory Group would be called upon whenever needed.

The regional gene bank and the national units would require moisture-proof seed containers and packages; in addition electricity consumption of the regional bank would need to be covered. For the regional documentation system punch cards and computer time is required to enable electronic data processing. The Regional herbarium will require additional cabinets, etc, in due time. A field vehicle and some laboratory equipment is also required for each unit.

For field operations, one set of field and laboratory equipment (i.e. carry-all vehicle, seed cleaner, seed thresher, dehumidifier, seed-moisture tester, seed packages, collecting equipment for each unit in Afghanistan, Iran, Iraq, Pakistan, Syria and Turkey are foreseen from the beginning of the project. In addition, operational expenditures (shipment of collections, mail, fuel etc.) are required.

Twelve fellowships, each of 15 months duration for the training of the professionals are required for Afghanistan, Iran, Iraq, Pakistan, Syria and Turkey (two each).

The Managing Board, which ought to consist of one administrator and one technical staff member from each co-operating country, will meet once a year, in 1974 twice, to discuss the work programmes. Their venue will rotate among co-operating countries. The costs of these meetings (travel and allowance) is foreseen to be covered by the project budget.

The professionals involved in the project should be given the

opportunity to attend technical conferences abroad. For this reason, an allocation has been made in the budget. It is expected that in the future IBPGR will be willing to organize and finance participation in such conferences.

(3) The Potential Role of Associate Experts

The project would greatly benefit from the services of associate experts in the following fields :

- (i) Documentation;
- (ii) Conservation, to deal with special problems;
- (iii) Tree fruit exploration and conservation;
- (iv) Plant quarantine.

Their duty station would be Izmir.

(4) The Nature of Counterpart Contribution

(a) Personnel

In part VI (B), 2, the nature of the personnel inputs under the project budget have been described. The locally recruited part of this staff will be concerned with the activities taking place at the Project headquarters.

In addition it is required as a minimum that each co-operating country make available at its own expense the following staff to serve at the respective national units :

- 2 professionals
- 1 bilingual secretary
- 2 technicians
- 1 driver

In the case of all countries, except Turkey, one of the professionals will be head of the national unit and member of the Managing Board in accordance with statutes of the Board. In the case of Turkey one of the professionals should in view of the needs of the regional project be a documentalist and the other a quarantine officer.

Staff hire, supplementary salaries and per diems for the local personnel involved in the project are requested out of the project funds; since their services are, on the whole, for the international community and not restricted to the interests and benefits of their own countries.

(b) Buildings

Approximately 600 m³ of buildings, comprising four units

- (a) a threshing, cleaning room;
- (b) a seed preparation room;
- (c) a short-term seed storage room for working stocks;
- (d) offices, etc.

The seed preparation room must be air-tight and equipped with a dehumidifier, which will be provided by the Donor. Otherwise, no special structural requirements are necessary.

(c) Equipment (each country)

Normal offices and laboratory furniture available locally will be supplied by co-operating countries.

5. Reporting

Once a year the Managing Board will prepare a report on the past year's activities together with the work plan for the coming year. This report is to be made available to (a) the Governments of the co-operating countries, (b) the Executing Agencies which in their turn will convey the contents of these documents to the International Body for Plant Genetic Resources (IBPGR) and to the Financing Agency. At the conclusion of the project the Board will prepare a comprehensive final report to be similarly distributed.

6. Follow-up

The expectation that the international community of nations will find ways and means of continuing support to the regional efforts to collect and preserve plant genetic resources is born out by recent development in this field. In the specific case of the regional projects for the Near East it is expected that the Executing Agency will strive to identify any additional sources of financing that will be available, in order further to strengthen this project. In this context it should be kept in mind that the IBPGR may be in a position to make some financing available. This is one - but not the only reason - why close contact with the IBPGR is required. Another fact is that the IBPGR assists in promoting and financing a global network of Genetic Centres within which the regional project for the Near East will be fitted.

In the meanwhile, a leader pilot project can be successfully undertaken at very modest cost with very substantial benefits in (1) the preservation of irreplaceable genetic resources; (2) establishing a pattern for international and regional co-operation in an activity of growing importance to mankind; (3) the evaluation and utilization of plant germ plasma material on a regional basis. The last point which is of extreme importance should be strongly supported and constitutes a natural follow-up of the present project.

V. ESTIMATED COSTSA. Penor Contribution in US \$

1. Project Code	Man/ Months	$\frac{1}{2}$ 1974	1975	1976	1977	$\frac{1}{2}$ 1978	TOTAL
<u>Code 10</u>							
1. Project Coord. (P-5)	48	16,000	32,000	32,000	32,000	16,000	128,000
2. Assist. Project Coord. (P-4)	48	14,000	28,000	28,000	28,000	14,000	112,000
3. Consultants	14	4,000	11,000	9,000	7,000	2,500	33,500
Sub-total		34,000	71,000	69,000	67,000	32,500	273,500
<u>Code 20</u>							
1. Annual Man. Board Meeting expenses 2 persons/country/year		5,500	5,500	6,000	6,500	6,500	30,000
2. Attendance at technical conferences		2,500	5,000	5,000	2,500	1,250	16,250
3. Official duty travel		3,500	7,000	6,000	6,000	2,500	25,000
Sub-total		11,500	17,500	17,000	15,000	10,250	71,250
<u>Code 30</u>							
1. Local expenditures, staff, hire, etc.		35,000	77,000	85,000	93,000	50,000	340,000
Sub-total		35,000	77,000	85,000	93,000	50,000	340,000
<u>Code 40</u>							
1. Rental and maintenance (computer time, repairs, running expenses of seed storage)		7,500	15,000	15,000	15,000	7,500	60,000

	<u>Man/ Months</u>	<u>1974</u>	<u>1975</u>	<u>1976</u>	<u>1977</u>	<u>1978</u>	<u>TOTAL</u>
2. Shipment of materials and Communication		3,000	6,000	6,000	6,000	2,500	23,500
3. Miscellaneous and contingencies		7,000	13,000	14,000	14,000	7,000	55,000
Sub-total		17,500	34,000	35,000	43,000	17,000	147,300
<u>Code 50</u>							
1. Seed storage suppl.		3,000	9,000	11,000	5,000	2,000	30,000
2. Documentation suppl.		1,500	4,000	4,000	2,000	1,000	12,000
3. Printing		3,000	4,000	4,500	4,500	2,500	18,000
4. Fuel supply		4,000	6,000	6,000	6,000	3,000	25,000
Sub-total		11,500	23,000	25,500	17,500	8,500	86,000
<u>Code 60</u>							
1. Herbarium equipment		1,500	3,500	4,000	4,500	2,500	16,000
2. Purchase of publications		5,000	4,000	4,000	4,000	3,000	20,000
3. 6 carry-all vehicles (purchase, transport, insurance)		42,000	-	-	-	-	42,000
4. Field and laboratory equipment		45,000	-	-	-	-	45,000
Sub-total		93,500	7,500	8,000	8,500	5,500	209,000
<u>Code 70</u>		-	-	-	-	-	-
<u>Code 80</u>							
Fellowships	180	45,000	45,000	-	-	-	90,000
Sub-total		45,000	45,000	-	-	-	90,000
<u>Code 90</u>		34,720	38,500	33,530	34,270	17,325	157,345
Total		282,720	313,500	273,030	279,070	141,075	1,289,345

V. ESTIMATED COSTSB. Counterpart Contribution1. Afghanistan

	<u>Afs.</u>	<u>US \$</u>
(i) Personnel		
Professionals (2)	500,000	7,500
Technicians (2)	250,000	3,750
Secretary (1)	300,000	4,500
Driver (1)	150,000	2,250
(ii) Equipment and supplies	60,000	900
(iii) Buildings and land	available	

2. Iran

	<u>Kiril</u>	<u>US \$</u>
(i) Personnel		
Professionals (2)	2,000,000	27,000
Technicians (2)	1,500,000	20,000
Secretary (1)	750,000	10,000
Driver (1)	750,000	10,000
(ii) Equipment and supplies	150,000	2,000
(iii) Building and land	available	

3. Iraq

	<u>I.D.</u>	<u>US \$</u>
(i) Personnel		
Professionals (2)	10,000	33,000
Technicians (2)	4,000	13,200
Secretary (1)	3,000	9,900
Driver (1)	1,250	4,125
(ii) Equipment and supplies	750	2,475
(iii) Buildings and land	available	

4. <u>Pakistan</u>		
	<u>Rupies</u>	<u>US \$</u>
(i) Personnel		
Professionals (2)	156,000	15,600
Technicians (2)	96,000	9,600
Secretary (1)	36,000	3,600
Driver (1)	18,000	1,800
(ii) Equipment and supplies	20,000	2,000
(iii) Building and land	available	
5. <u>Syria</u>		
	<u>L.S.</u>	<u>US \$</u>
(i) Personnel		
Professionals (2)	80,000	20,000
Technicians (2)	40,000	10,000
Secretary (1)	15,000	3,750
Drivers (1)	15,000	3,750
(ii) Equipment and supplies	5,000	1,250
(iii) Building and land	available	
6. <u>Turkey</u>		
	<u>TL.</u>	<u>US \$</u>
(i) Personnel		
Professionals (2)	350,000	25,000
Technicians (2)	175,000	12,500
Secretary (1)	87,500	6,250
Driver (1)	87,500	6,250
(ii) Equipment and supplies	980,000	70,000 + costs storage installation
(iii) Building and land	available	

BACKGROUND

The domestication of plants and animals has been a revolution in the life span of humanity. Human beings depend upon plants, directly or indirectly for obtaining most of their needs.

Parallel to the increase in human population on the earth, the demand for plant sources has increased. As a natural result of this, humanity faces, among others, hunger problems which are becoming more and more serious. To overcome this immense problem, the scientists have rightly aimed at increased yield per unit areas. The best result for this purpose has been obtained through breeding new varieties of cultivated crops. The application of improved crop varieties, however, is causing extinction of old primitive cultivars and their wild relatives, which are on the other hand, the best sources of variation and on which plant breeding highly depends.

The Russian scientists N.I. Vavilov and his colleagues have been collecting cultivated plants from all over the world during the 1920s. Their studies on the collected material revealed the existence of eight Centres of Origin or Centres of Genetic Diversity on the earth. These Centres were referred to as Gene Centres later on. These Centres are as follows :

- I. The Chinese Centre
- II. The Indian Centre
- II.a. The Indo-Malayan Centre
- III. The Central Asiatic Centre
- IV. The Near Eastern Centre
- V. The Mediterranean Centre
- VI. The Abyssinian Centre
- VII. The South Mexican and Central American Centre
- VIII. South American (Peruvian-Ecuadorian-Bolivian) Centre
- VIII.a. Chiloe Centre
- VIII.B. The Brazilian Paraguayan Centre

Rapid development of plant breeding techniques and utilization of genetic material originating in these regions of the world, has increased mankind's dependence on preservation of these genetic sources, which, today, are in danger of extinction; (i) because of human and animal pressures, and (ii) in no small measure from man's success in displacing local cultivars characterized by a very wide genetic variation, with modern high-yielding varieties, with a very narrow genetic base. Theoretically, if man succeeded in substituting the narrow based uniform varieties, the so-called improved varieties, for the so-called primitive cultivars, he would be in danger of imminent disaster, because he would have succeeded in destroying the heterogenous material from which he derives the needed genes to counteract the inevitable evolution taking place in plant diseases and pests. Prof. Harlan

has recently and correctly said: "to waste and squander our genetic resources of crop plants might be as dangerous as atomic warfare".

The more advanced stages of plant breeding are most dependent on a wide range of genetic resources because of the specific character of the requirements of the breeding programmes. Furthermore, those countries of the world with the most advanced plant breeding programmes are located outside of the gene centres and the great bulk of their economically important plants are introductions, which must be sustained through plant breeding programmes, dependent upon material only available from these gene centres.

Following are some examples illustrating the importance of local cultivars and their wild relatives, originating from Turkey, for crop improvement programmes:

- Septoria has become a serious problem for Mexican wheat varieties when they were grown in Turkey. Strains of bread wheat, resistant to Septoria were found among local cultivar collections from Turkey and is being incorporated in the Mexican wheat varieties.
- In a study where USDA World Durum Collections has been screened for stem rust (Puccinia graminis tritici) resistance, it was found that most of the varieties resistant to four races of the pathogene came from southern Turkey.
- Similarly, USDA World Aestivum Collection has been screened for snow-mould resistance and the only resistant varieties were found to have originated from a small plain in South-East Turkey and in an isolated valley in Eastern Turkey.
- Dr. L. Johnson (U.S.A.) has found strains of Triticum monoccoccum with high protein content originating from Turkey. This discovery might open a gate for increasing protein content in hard and bread wheats.
- Resistance to barley leaf beetle has been reported in hairy forms of Hordeum spontaneum originating from Turkey.
- Characters like non-shattering pod, subterranean pod formation, soft seed coat found in some of the common vetches originating from Turkey, are very valuable for breeding purposes.

Many more examples of this type could be quoted.

Until fairly recent times, germplasm collection and preservation activities have been confined at best to national efforts, largely concentrated in the so-called developed countries with advanced plant breeding programmes. These activities were primarily undertaken to collect material to be used in solving current breeding problems. In many cases, the material was screened and when the problem was solved, the collected material was destroyed. There was a tendency to consider the gene centres as permanent gene banks. In recent years, plant breeders, economic botanists, etc. have become alarmed by the depletion of the "natural" gene banks. As a result, national and regional efforts to establish permanent gene banks which could preserve these genetic resources for posterity have been undertaken. However, to date, with one exception, the gene bank in Izmir, the established gene banks are outside the gene centres, and collection and preservation activities of germplasm material within the gene centres are highly fragmented and uncoordinated. Furthermore, such fragmented and uncoordinated efforts yield very limited results considering the cumulative costs to the participants. If these expenditures were channelled through a coordinated global effort utilizing local personnel, far greater achievements would be realized. Additionally, the benefits to the developing countries from participating in an organized coordinated effort would be substantial. Local personnel, trained and utilized in collection and preservation activities in their own country would contribute significantly to the utilization of this native material in economic, national plant breeding programmes. Ideally, existing regional and national institutions concerned with the preservation and utilization of the plant genetic resources should be organized in an international association in order to provide a framework within which their individual efforts can be coordinated and new initiatives taken on a priority basis.

Within this global framework regional cooperation is of great importance. It is neither necessary nor economic to establish permanent gene banks for long-term storage in every country. The feasible solution is to establish such gene banks to serve regions on a geographic basis. These require coordinated regional collection and preservation activities. This is particularly so in the case of multiplication and rejuvenation of collections. If local personnel are to participate in these activities which are concentrated in the developing countries, regional projects facilitate training and guidance. Experience has proven that local personnel with training and guidance are far superior collectors in their own countries than expatriates with limited knowledge of the working environment.

National and international concern about the loss of the genetic resources of crop plants in the Middle East resulted in the establishment of an Introduction Centre at Izmir in 1964, under a UNDP/SE/FAO project (TUR/8). This project terminated definitely on 31 December 1973.

SEED CONSERVATION

by Dr. Lennart Kåhre, Swedish Seed Testing and Certification Institute, S-171 73 Solna, Sweden.

The science of seed longevity

A seed embryo can be defined as a plant in a resting stage. This kind of latent life has since long stimulated and fascinated nature scientists all over the world.

At the end of the last century the botanists found that the seeds are respirating during storage. They started to study "the life span of seeds". Becquerel (1907) published one of the first reports in this connection, dealing with 500 species of 30 families conserved in Paris. The seed age varied between 25-135 years. He found the leguminous seed species to be long-lived e.g. Trifolium arvense L. had living seeds after 68 years (2 of 10 investigated). Another classic was Ewart (1908), who studied the viability of 600 seed species maintained in Melbourne. In addition to his own material he reviewed data obtained by other scientists, so totally he discussed about 1 400 species. He classified the seed species as to their longevity in the following three categories:

- | | |
|----------------|------------------------------------|
| a. microbiotic | (seed longevity less than 3 years) |
| b. meso- | " " 3-15 years) |
| c. macro- | " " 15- more than 100 years) |

Most of the species were classed as microbiotic, but Becquerel's observation as to some seed species of Leguminosae being macrobiotic was confirmed. In addition Ewart mentioned some species of Malvaceae and Myrtaceae to be long-lived.

The storage conditions should be "optimal" for Ewart's classification to be valid, but 40 years later Urocker (1948) still questioned if we know for a single species what are optimal storage conditions. He raised that question after many years' progressive seed research in the United States of America. And in our time in the introduction to the book "Viability of Seeds" Prof. E H Roberts (1972) states: "... there are still contradictions, errors and differences of opinion, and the subject is still incomplete and fragmentary. But progress has been made: more fragments exist and some of them begin to tell a story". We are now able to prolong the life of seeds more than earlier was considered possible.

Factors influencing the storability of seeds

Some important factors regulate the seed longevity.

1. Anatomical structure
2. Maturaty stage
3. Mechanical damages
4. Moisture (relative humidity) - temperature and packages
5. Microflora, insects and mites

The seed structure is the reason behind the longevity of some leguminous seeds mentioned above and reported in many other investigations. The "hard" seeds are well-known in this connection and well explained by Hyde (1954). - A well maturated seed has a better physiological back-ground for storage over a longer period than unripe seeds. That was found by Nobbe (1876) already 100 years ago when he studied

Brassica over four years storage. At the end 92 per cent of the full-ripe seeds were alive, but only 43 per cent of the unripe seeds. In red clover the corresponding figures were 58 and 6 per cent respectively.

Mechanical damages can destroy even the best seed (e.g. Esbo 1959, Moore 1972).

The moisture-temperature relationships are of outmost importance for the seed conservation. Also the type of seed is again of influence. Starchy seeds contain more moisture than e.g. oily seeds. Harrington (e.g. 1973) has formulated two "rules-of-thumb" to explain the effect of moisture and temperature on seed longevity:

1. For each decrease of 1 per cent in seed moisture content the life of the seed is doubled (between 4 and 14 per cent moisture).
2. For each decrease of 5°C in seed temperature the life of the seed is doubled (at least between 0°C and 50°C).

It is obvious that the drier the seed the longer it will remain viable under warmer conditions.

Based on numerous experiments the Dutch grain specialist Kreyger (1972) made a classification of different seed species with respect to their loss of germination during storage and considering different moisture-temperature sets. His five categories are:

1. Very strong seeds

Rape, linseed, rough stalked meadow grass, barley

2. Rather strong seeds

Oats, beetseed, perennial ryegrass, field peas, green peas, creeping bentgrass

3. Less strong seeds

Brown beans, dwarf French beans, runner beans, wheat

4. Rather weak seeds

Red fescue, maize

5. Very weak seeds

Rye, onion

He has made diagrams on the relationships between the estimated maximal duration of safe storage and temperature for various moisture contents (expressed as relative humidities of the equilibrium atmosphere). Fig. 8-12 are taken from his recent publication: "Drying and Storing Grains, Seeds and Pulses in Temperate Climates". It should be noted from these diagrams that the absolute moisture content of the air varies with the temperature (lower temperature means less and higher temperature more absolute moisture). Harrington (1973) means that the equilibrium moisture content may vary $\pm$ 2 per cent due to variations not only in storage temperature but also in chemical composition of different seed lots and hysteresis effects.

In order to give some guidance for translation of relative

humidities of the equilibrium atmosphere into seed moisture contents Kreyger has presented some tables (3-5). These data indicate that it is possible to keep seed viability for 20 years or more at a temperature of 0 to +5°C and a relative humidity of 40-60 per cent in case of very strong seeds i.e. 6-7 per cent moisture content in rape, 9-11 per cent in meadowgrass and 10-13 per cent in barley. In rather strong seed the relative humidity must be 40-50 per cent i.e. 9-11 per cent moisture content in oats and ryegrass, 8-9 per cent in beet and bentgrass and 10-11 per cent in peas. The less strong seeds cannot be kept above 40 per cent humidity and not above $\pm 0^\circ\text{C}$ to be alive after 20 years. That means 9 per cent moisture content in beans and about 10 per cent in wheat. The rather weak (e.g. red fescue and maize) and the very weak seeds (e.g. rye and onion) cannot survive for such a long period, except at a sub-zero temperature and at 30-40 per cent relative humidity.

Dr. L N Bass (1973), who is head of the National Seed Storage Laboratory in Fort Collins, Colorado, USA, has recently made a survey on seed storage in "Seed Science and Technology", the new publication from the International Seed Testing Association (ISTA). That covers 104 literature references. In connection with the more "difficult" seed species he summarizes that high viability of low-moisture content vegetable, flower and tree seeds was maintained during 20 years of sealed storage at -4°C . Onion seeds showed no loss of viability in up to 18 years.

There are many choices in seed packages. Grabe & Isely (1969) have concluded results of an intensive long-term (6 years) seed packaging experiment, which originally was designed and initiated by Bass at Iowa State University. They found that cans were the only container that were completely moisture proof. The other packaging materials ranked in the following descending order: Polyester-polyethylene, cellophane, kraft paper and cloth.

Harrington (1973) and others have found it absolutely essential to package only dry seed in moisture-proof cans. He recommends 6-12 per cent moisture content for starchy seeds and 4-9 per cent for oily seeds in this connection. The recommended type of packages include e.g. tin cans, glass jars with gasketed screw top lids and steel drums with clamp-down gasketed lids. Harrington & Douglas (1970) have described the procedures to be applied in more detail in chapter 22 in their text-book "Seed storage and packaging - applications for India". They point out the possibility to obtain and maintain a low seed moisture content by using silica gel and sealed containers instead of dehumidifying the whole storage. This procedure has also been used e.g. in Sweden where red clover seed samples are conserved since 1955 at about $+5^\circ\text{C}$ and by means of a desiccant a moisture content of about 7 per cent was reached very quickly. The germinability has been kept quite well in the past 20 years (Bingefors 1974).

As a rule the influence by microorganisms and insects is much reduced and even eliminated when the storage facilities are such that the seed can be kept cool and dry (e.g. Christensen 1973, Howe 1973).

From a practical point of view it is very important to clean and dry the seed well before it is stored. When drying the seed the seed temperature again is critical. The wet seed is damaged by high temperatures. There is clear evidence for that in e.g. Swedish experiments (Lindberg & Sörensson 1959 and Appelqvist 1965). When the seed moisture content is up against 35-40 per cent the seed temperature should not exceed 35°C.

Practical applications

The function of a gene-bank is two-fold. One has the long-term aspect (keep and not touch!). The other has the short-term intention (living exchange). So, in addition to the biological classification of species based on their seed storability there are more reasons to arrange more storage rooms in a gene-bank. In the book "Viability of Seeds" the seed storage laboratories in Fort Collins, USA (James 1972) and Hiratsuka, Japan (Ito 1972) are described more in detail.

It is important to establish storage facilities for a temperature range (something between + 5°C (standard) and - 20°C).

Fort Collins maintains about + 4°C with an average relative humidity of 32 per cent as standard. This temperature was selected as being suitable for most seeds. Three rooms are equipped for a temperature of - 12°C.

In Hiratsuka the storage for seed multiplication is kept under - 10°C and that for seed distribution at - 1°C. The seed moisture seems to be held at 4-6 per cent.

Völknerode, Federal Republic of Germany has - 10°C and 6 per cent seed moisture, Bari, Italy - 1°C and 30 per cent relative humidity in the storage atmosphere and Izmir, Turkey ± 0°C and 6 per cent seed moisture.

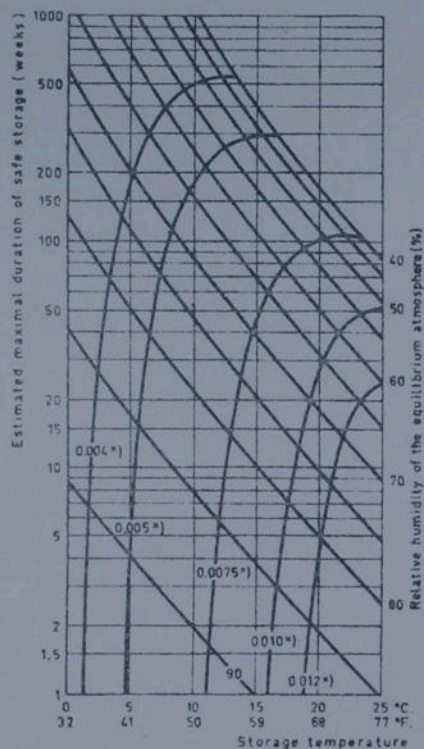
Summary

In long-term storage of seed the most important factors are low temperature and low moisture content. Potts (1971) has characterized the life stages of a seed. The aim of seed conservation is to keep the capabilities of the mature seed at a maximum for the longest possible time.

Litterature references

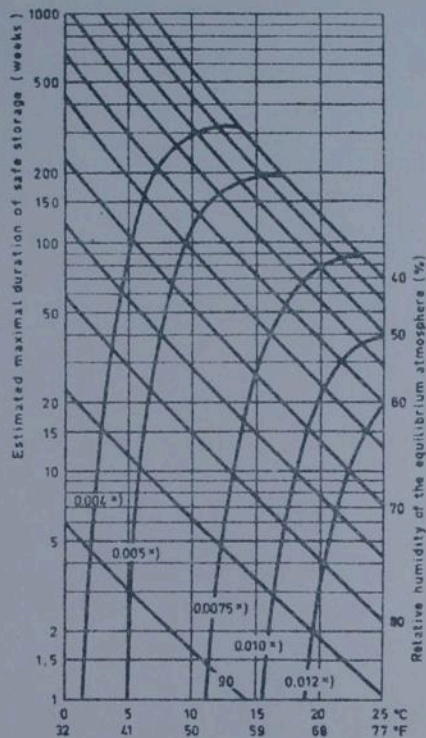
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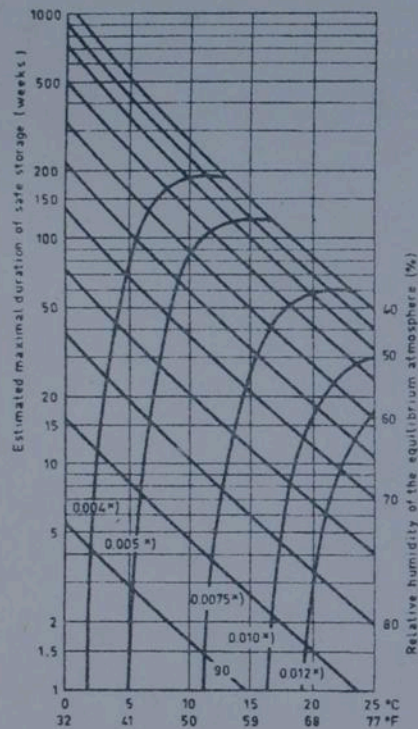
x) Curves indicating equal absolute moisture content of the air (kg/kg - lb/lb)

Fig 8 Relationship between estimated maximal duration of safe storage temperature for various moisture contents, expressed as relative humidities of the equilibrium atmosphere (very strong seeds, criterion germination, see Tables 9.3.4. and 5).



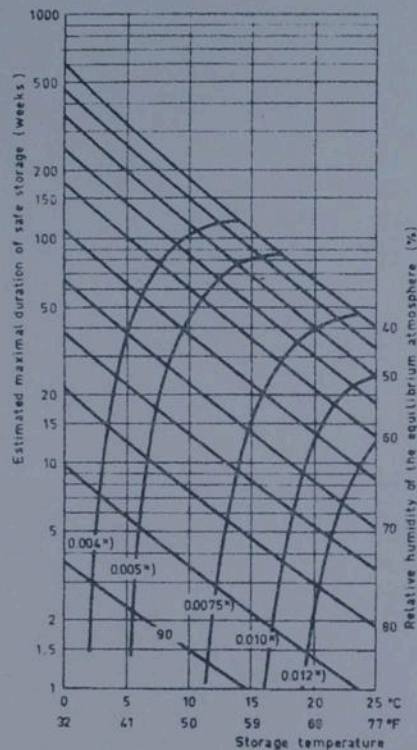
*) curves indicating equal absolute moisture content of the air (kg/kg - lb/lb)

Fig 9 Relationship between estimated maximal duration of safe storage and temperature for various moisture contents, expressed as relative humidities of the equilibrium atmosphere (rather strong seeds, criterion germination, see Tables 9.3.4. and 5)



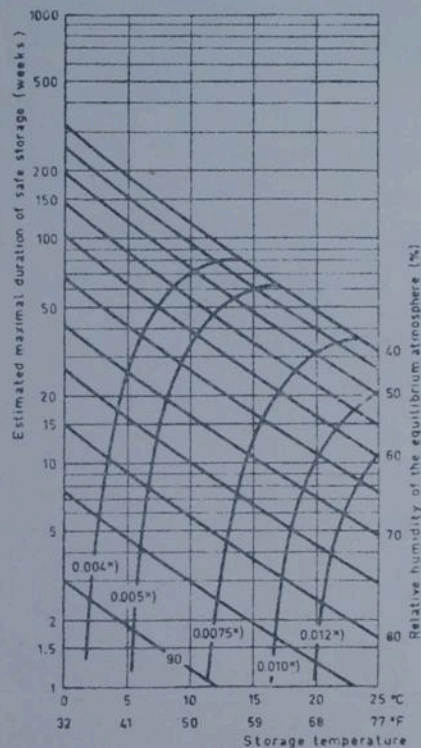
*) curves indicating equal absolute moisture content of the air (kg/kg - lb/lb)

Fig 10 Relationship between estimated maximal duration of safe storage and temperature for various moisture contents, expressed as relative humidities of the equilibrium atmosphere (less strong seeds, criterion germination, see Tables 9.3.4 and 5)



x) curves indicating equal absolute moisture content of the (kg/kg - lb/lb)

Fig 11 Relationship between estimated maximal duration of safe storage and temperature for various moisture contents, expressed as relative humidities of the equilibrium atmosphere (rather weak seeds, criterion germination, see Tables 9.3.4 and 5)



x) curves indicating equal absolute moisture content of the air (kg/kg - lb/lb)

Fig 12 Relationship between estimated maximal duration of safe storage and temperature for various moisture contents, expressed as relative humidities of the equilibrium atmosphere (very weak seeds criterion germination, see Tables 9.3.4 and 5)

TABLE 3. Moisture relations of 5 grains (lit. 13, 8, 5)

Relative humidity of the equilibrium atmosphere %	Equilibrium moisture content w (wet basis) %				
	wheat	barley	oats	rye	maize
92.5	25.5	27.5	25.2	28.5	22.5
90	23.0	22.7	22.0	24.4	20.7
87.5	21.0	20.7	20.0	22.1	19.2
85	19.6	19.4	18.6	20.3	18.0
82.5	18.4	18.3	17.5	19.0	17.2
80	17.6	17.2	16.7	17.9	16.5
77.5	17.1	16.6	16.0	17.0	16.0
75	16.6	16.1	15.4	16.2	15.4
72.5	16.1	15.6	14.8	15.4	15.0
70	15.6	15.0	14.3	14.9	14.6
67.5	15.1	14.5	13.8	14.4	14.1
65	14.7	14.1	13.3	14.0	13.8
62.5	14.2	13.6	13.0	13.6	13.4
60	13.7	13.2	12.5	13.3	13.1
55	12.8	12.3	11.7	12.4	12.4
50	12.0	11.4	11.0	11.7	11.9
45	11.3	10.6	10.2	10.9	11.2
40	10.7	9.8	9.5	10.1	10.7
35	9.9	9.0	8.7	9.3	10.0
30	9.1	8.3	8.0	8.6	9.3
			25 - 35°C 77 - 95°F		12 - 25°C 53 - 77°F
			TEMPERATURE		

TABLE 4 : Moisture relations of 10 sorts of seeds (lit. 8)

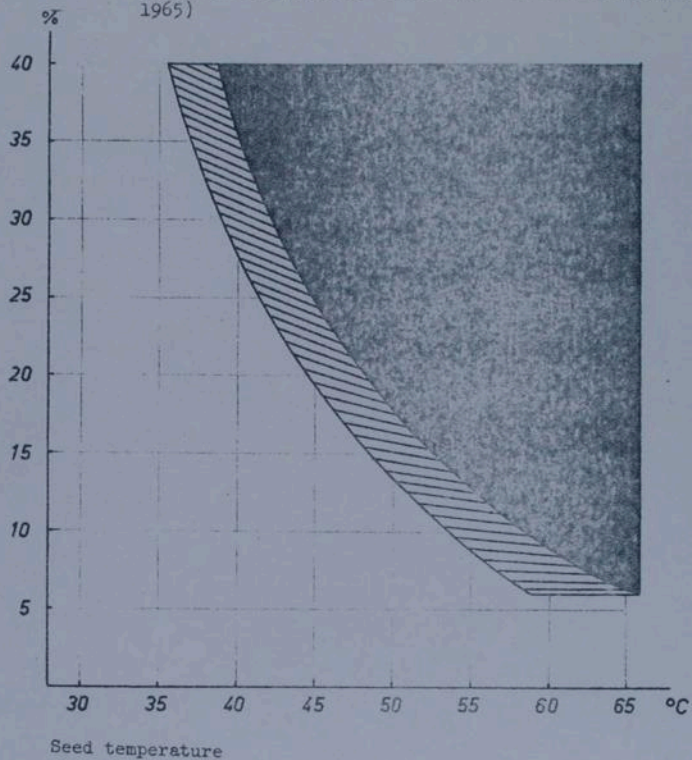
Relative humidity of the equilibrium atmosphere %	Equilibrium moisture content (w) (wet basis) %									
	Rape	Linseed	Caraway seed	Fodderbeetseed	Opium poppy seed	Onion seed	Perennial rye grass seed	Rough stalked meadow grass seed	Red fescue seed	Creeping-bent grass seed
92 ⁵	21.0	20.9	23.0	27.0	19.1	27.5	27.2	25.0	25.3	25.3
90	17.4	18.1	19.8	22.2	17.0	23.4	24.0	21.3	23.1	19.2
87 ⁵	15.3	16.0	18.0	19.8	15.0	21.1	21.6	19.5	21.3	17.5
85	13.8	14.5	16.5	18.4	13.7	19.2	19.9	18.1	19.8	16.2
82 ⁵	12.7	13.4	15.4	17.7	12.6	17.6	18.5	17.0	18.4	15.2
80	11.8	12.4	14.5	16.1	11.7	16.2	17.3	16.1	17.3	14.4
77 ⁵	11.0	11.7	13.7	15.1	11.0	15.0	16.2	15.3	16.2	13.7
75	10.2	11.1	13.0	14.2	10.3	14.0	15.3	14.6	15.3	13.0
72 ⁵	9.3	10.5	12.5	13.6	9.9	13.2	14.7	14.0	14.5	12.5
70	8.8	10.0	12.0	13.0	9.5	12.6	14.0	13.5	13.8	12.1
67 ⁵	8.4	9.5	11.5	12.1	9.1	12.0	13.4	13.1	13.2	11.7
65	8.0	9.1	11.1	11.6	8.7	11.5	12.8	12.8	12.6	11.3
62 ⁵	7.6	8.7	10.7	11.2	8.3	11.1	12.4	12.4	12.1	10.9
60	7.4	8.4	10.3	10.3	8.0	10.8	11.9	12.0	11.6	10.5
55	7.0	7.8	9.6	9.4	7.4	10.2	11.2	11.2	10.9	9.8
50	6.6	7.3	9.0	8.6	6.9	9.6	10.6	10.5	10.3	9.2
45	6.2	6.7	8.4	7.8	6.3	8.9	9.9	9.7	9.6	8.5
40	5.7	6.3	7.8	7.1	5.9	8.2	9.1	9.0	8.8	7.9
35	5.3	5.7	7.2	6.4	5.4	7.5	8.4	8.3	8.0	7.3
30	4.9	5.1	6.7	-	4.9	6.9	7.6	7.5	7.0	6.7
25	4.4	4.3	6.2	-	4.4	6.3	6.8	6.8	-	-
20	3.9	-	-	-	-	-	5.9	-	-	-
25 - 35°C - 77 - 95°F										
temperature										

TABLE 5: Moisture relations of 5 sorts of leguminous seeds (lit. 8)

Relative humidity of the equilibrium atmosphere %	Equilibrium moisture content (w) (wet basis)				
	Brown beans	Dwarf French beans	Runner beans	Field beans	Green peas
92 ⁵	32.0	-	-	-	31.5
90	27.8	-	29.7	29.1	27.2
87 ⁵	25.2	25.5	27.0	26.2	24.8
85	23.1	23.2	25.0	24.4	23.0
82 ⁵	21.8	21.6	22.7	22.6	21.2
80	20.5	20.2	20.8	21.0	19.3
77 ⁵	19.1	18.8	19.2	19.4	17.8
75	18.0	17.6	17.8	18.0	16.8
72 ⁵	16.8	16.5	16.8	16.7	16.0
70	15.8	15.7	15.9	15.7	15.3
67 ⁵	15.0	15.0	15.1	14.9	14.7
65	14.3	14.5	14.3	14.2	14.1
62 ⁵	13.7	13.9	13.5	13.6	13.6
60	13.2	13.4	12.9	13.1	13.1
55	12.1	12.3	12.0	12.1	12.2
50	11.1	11.2	11.2	11.2	11.3
45	10.1	10.2	10.2	10.4	10.5
40	9.1	9.1	8.8	9.5	9.7
35	8.1	8.0	-	-	8.9
30	7.1	-	-	-	8.1
25	6.1	-	-	-	-
	25 - 35°C - 77 - 95°F				
	temperature				

Seed
moisture

Relationship between moisture content and critical
temperature in Brassica oilspecies. The dark and
shadow areas indicate reduced germination (Appelqvist
1965)



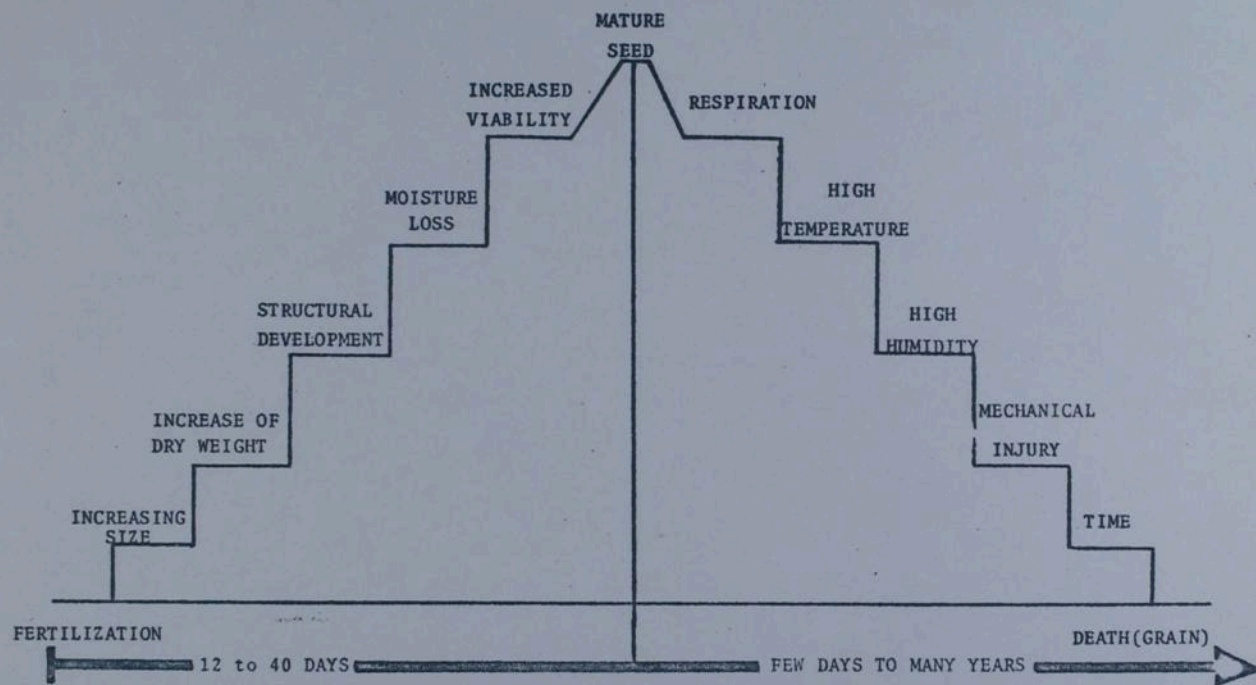


PLATE 5

THE RISE AND FALL OF A SEED'S CAPABILITIES

DELEGATES

Afghanistan

1. Mr. Aref Nouri - President Research and Soil Studies, Ministry of Agriculture
2. Dr. Azam Gul - Faculty of Agriculture, Kabul University

Syria

1. Mr. Walid El-Malek - Ministry of Agriculture and Agrarian Reform
2. Mr. Michel Ghazi - Ministry of Agriculture and Agrarian Reform

Turkey

1. Prof. Dr. Vamik Taysi - Ege University
2. Mr. Burhanettin Doruk - Ministry of Food, Agriculture and Animal Husbandry

Pakistan

1. Mr. M.I.Rehmani- Deputy Secretary, Economic Affairs Div., Min. of For. Affairs
2. Mr. I.Hussain - Director, Crop Research, Agricultural Research Council, Karachi

OBSERVERS

Ambassadors

His Excellency, Ambassador of Afghanistan, Ankara, Turkey: Sayid Muhammad
Mr. S.Heppling, Resident Representative, UNDP, Ankara, Turkey.

Food and Agricultural Organization of the United Nations- FAO

Mr. R. Pichel, Chief, Crop Ecology and Genetic Resources Branch, Plant Production
and Protection Division, FAO, Rome-Italy.

Dr. C. Beringer, FAO Country Representative, UNDP Ank.-Turkey

Prof. D.Rogers, Consultant, FAO, Rome-Italy

Mr. O. Havsteen-Mikkelsen, Operations Officer, FAO, Rome- Italy.

Swedish International Development Authority-SIDA

Mr. P.Rydén, Stockholm-Sweden.

Rockefeller Foundation

Dr. B.Wright, Wheat Research and Training Centre, Ankara-Turkey.

F.R.Germany

Prof. Dr. W.Hondelmann, Director, Gene bank, Braunschweig.

Sweden

Dr. H.Palmstierna, Advisor to Swedish Government, Stockholm.

Prof. L. Kahre Director, Seed Testing Institute, Soina.

U.S.A.

Prof. J. Harlan - University of Illinois

EGE UNIVERSİTESİ SENATO ÜYELERİ (SENATE MEMBERS OF EGE UNIVERSITY)

Rektör: Prof. Dr. Yusuf Vardar

Prörektör : Prof. Dr. Mustafa Uluöz.

Rektör yardımcısı : Prof. Dr. Mahmut Bilsel

Ziraat Fakültesi Dekanı : Prof. Dr. İbrahim Karaca

Fen Fak. Dekanı : Prof. Dr. Necmettin Zeybek

Senato Üyesi : Prof. Dr. Kazım Bayraktar

" " : Prof. Dr. Dilsat Elbrus

AEGEAN REGIONAL AGRICULTURAL RESEARCH INSTITUTE

Mr. Alpman

Miss Sencer

Dr. Atay - Director

Mrs. Settar

Dr. Temiz - Assistant Director

Harlan → Costs the most and the least fun

~~B-418~~ Computerized Documentation in a genetic resources centre.
Refer To Ebbe's paper for the Conference

1. Definition of Documentation in GRC = really, means of communication.

a. All the data/info. about all the collections of G.R.

Examples: Collection, quarantine, storage, utilization.

b. All activities prod. some data.

2. How much data?

a. For each collection, as many as 100 separate pieces of data.

If we had only 100 collections in a GRC = $100 \times 100 = 10,000$
separate data points

If 10,000 collections, 1,000,000 - data points -
etc.

Many of our collections of G.R. number 50-100,000
already, and are constantly expanding.

b. Manual techniques to recover any one of the pieces
of data, for any one collection, is very cumbersome,
time consuming, inaccurate or incomplete.

c. Therefore necessary to employ computing machines
to efficiently accomplish any task -

3. Tasks involved:

Some sample questions - early March through

- How many peaches flower in April, in the
Bursa region of Turkey

- A wheat breeder in Syria wants all Triticum
aestivum with resistance to stem rust from
the central Plateau of Turkey -

The director of GRC in Afghanistan wants to know where all collections of barley were made over the last 5 years to plan future collecting work.

Two factors to consider - The computing and The data -

4. Use of computing machines -

a. - Not a very old process - less than 10 years since the last generation of computing machines available. Since 1968-70 when very good computer programs have been available for use.

b. - Complex set of problems to get the machine to do the work necessary

5. Complexity of genetic resource data

Describing living plants and their products provides most complex set of data of any science in the world.

Needs, therefore, best possible expertise -

Training ~~and so~~ of experts - both in data and in computing machines very important to guarantee best application.

6. Networks to share info. - between Nat'l GRC + Izmir + rest of world

Usually, before one sends actual samples of seeds, one asks for information about the seeds -

Therefore, necessary to set up communication transfer mechanisms - networks -



AGP REGISTRY

In reply please mention our
reference and date of this
letter

Via delle Terme di Caracalla, 00100-ROME

FOOD AND AGRICULTURE ORGANIZATION
OF THE UNITED NATIONS

Cables: FOODAGRI ROME

Telex: 61181 FOODAGRI

Telephone: 5797

Ref.

AGPE-PL 2/5

6 JUL 1973

Dear Dave,

... I am enclosing your draft preliminary report on the Agricultural
Research and Introduction Centre, Izmir, which has now been typed,
in order that you can amend it in any way that you think necessary.

Best regards,

Jorge León
Chief

Crop Ecology and Genetic Resources Unit
Plant Production and Protection Division

Dr. D.J. Rogers,
Dept. of Biology,
University of Colorado,
Boulder,
Colorado 80302,
U.S.A.

Send to Ebbe for editing
and additions.

July 24, 1973

Dr. Ebbe Kjellqvist
Agricultural Research and Introduction Station
P.O. Box 9, Menemen
Izmir, Turkey

Dear Ebbe:

I enclose a preliminary report of my work with you, for your editing and correction, or addition, whichever you think is needed. You will note that I ask you to supply a copy of each of the documents which we ~~are~~ prepared for collection records, storage records, morphological characters of the Gramineae, etc. I will appreciate it if you would send a corrected copy to Jerge in Rome, and send me a copy of any changes you may desire to make.

Still no news from FAO on the job situation. These guys move with the speed of a snail on a cold day. Is there any way to speed them up?

I would definitely like to hear from you--what has transpired? How are things going? Did you receive the letter I wrote from Nigeria? Please let me know any news.

Sincerely,

David J. Rogers
Professor of Biology

Encl.

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DRAFT 4 July 1973

PRELIMINARY REPORT OF D.J. ROGERS - CONSULTANT ON DOCUMENTATION, IZMIR, TURKEY,
AGRICULTURAL RESEARCH AND INTRODUCTION CENTRE (ARIC), JUNE 4 - 21, 1973

1. Request for consultant services from ARIC.
 - A. Examine and advise on documentation of collection records.
 - B. Examine and advise on documentation of morphological characters in cereals.
 - C. Examine and advise on documentation of storage records.
 - D. The same for rejuvenation and germination.
 - E. Determine possible means of establishing the computing system, TAXIR, for work of ARIC.
 - F. Devise means of preparing labels for storage cans and herbarium labels.
 - G. Provide techniques for placing old records into the TAXIR format.
2. General discussion of results.
 - A. (i) Before advances could be made on use of the information retrieval system TAXIR, it was necessary to give a short "course" on the philosophies of data structure and manipulations, as well as methods of deriving the maximum value from each data point. Many misconceptions of the requirements of the computing machine (unfortunately promulgated by previous consultants) had led the staff of the Unit to go into elaborate coding of data, forcing uncomfortable and useless endeavours. It was necessary to dispel the misconceptions and lead to more open, significant means of data structuring.
 - (ii) The personnel of the Unit in ARIC were extremely pleased and cooperative in their reception of the new philosophy and methodologies, and more, in a remarkably short time, ^{were} sufficiently knowledgeable on new methods of data structuring to proceed rapidly with the improvement of the collection, storage, rejuvenation and evaluation records.

(iii) The recommended changes establish ^{ed four} ~~from~~ data banks:

- (a) the collection records;
- (b) the long term storage records;
- (c) the active (working) collection records, and
- (d) the introductions bank.

While four separate data banks were recommended, any new data bank with different combinations of described data could be generated, using the facilities of TAXIR to perform the tasks.

Thus, an accession bank, or an introduction bank with germination and rejuvenation data could be easily accomplished, with any other desired descriptive information.

~~was discussed~~
~~Discussions on~~ means of handling evaluation data for the accessions were ~~made~~, but since no evaluation data was present, we decided to delay procedures for incorporating evaluation data until there had been an opportunity to see results of evaluations. It is probable that a separate bank of evaluation data will be necessary. At the moment, each accession that is sent out is accompanied by requests for return of evaluation data, but to date very few returns have been made. (The only evaluation mentioned was for a few accessions of Cicer, giving a small number of observations on morphology of the plants raised from the accessions).

- B. Another activity of the consultant was to discover means by which local personnel of the Unit could receive necessary instructions in data processing and management. Contacts with the Operations Manager of IBM for Turkey indicated willingness on the part of the local IBM Service Bureau in Ankara to provide this instruction free of charge to Unit members. This education is essential in furthering the work of documentation at the centre.

C. Computing facilities in Turkey were investigated. The only IBM machine of sufficient capacity to handle the loads of work of ARIC is in the Service Bureau of IBM in Ankara. While ^{the location of the computer} ~~it~~ is inconvenient to the work of the Unit in Izmir, it is possible to design means to accomplish data processing for the Unit in Ankara on a regular, meaningful basis. So far, no computers manufactured by other computing companies have been found in Turkey.

44 In Izmir, two IBM computing systems are in operation. An IBM 1130 is in Ege University, and an IBM 360/20 at Pamuk Mensucati T.A.S., a textile manufacturing firm. The latter is serving as a local service bureau for customers in the Izmir region, and is under the direction of a very intelligent, cooperative director, Mr. Giro. The former computer (at the University) is not service-oriented, but rather a learning machine for students in computer science. As a result, the 360/20 at the textile factory is the most likely useful connection for ARIC. Unfortunately, neither of these computers has sufficient size of memory to satisfy anything but peripheral ^{documentation} needs of ARIC.

44 A small contract was requested with the textile computer installation to print the required storage labels, and provide a simple editing routine for ARIC storage records. While this is a rather simple task, it was decided at this time not to proceed with other data processing ~~programs~~ of the textile service bureau because the personnel of ARIC need to begin their relations with computing centres on a scale understandable to them. If the first contract is agreed upon, and the service satisfactory, further contracts and developments can be made. A plan for further work at the textile facility was discussed with the staff of the Unit at ARIC, but no concrete steps were taken until the results of the first test can be evaluated.

3. Continuing activities and plans for future work

7) It was generally agreed by members of the Unit of ARIC that they should proceed with the concept that eventually the system TAXIR would be made available to them. They understood that it was not possible to establish the system ^{itself} ~~themselves~~, and that it would be necessary to have the assistance of a competent group in some international organisation to provide the programmes, convert these to the IBM 360/40 in Ankara, and train both computer personnel and the users (ARIC staff) in proper application of the system.

7) In the meantime, the documentation work at ARIC could proceed. A key-punch, on order for some months, should be installed momentarily. With the key-punch installed, a period of training in newer data formats will be required before the key-punch operator can function efficiently with the data of the Unit. After the operator has become accustomed to the work, a plan of procedure has been established to keep abreast of current data requirements and to begin the task of catching up on old records.

7) Considerable time was expended in recasting collection records, storage records, etc. into the new formats of TAXIR, namely descriptors and descriptor states. (No explanation is given in this report on the formats, but a manual of explanation was left with the staff of the Unit). ~~Since the consultant only has one copy of the new formats with him, they will not be appended to this preliminary report, but will be appended to the final report at a later date, along with other pertinent documents.~~ After redesign of the various records, a method to prepare the data in meaningful data banks was recommended (see paragraph 2.A ⁱⁱⁱ ~~(8)~~ above).

bbo
can you
apply
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In all cases of construction of new record formats discussed above, it was constantly emphasised that flexibility must be the main guide in maintenance of the record, rather than to "freeze" operating procedures into some format that would prove unworkable with later experience. Since the various correction and updating facilities of TAXIR allow for changes and improvements, there must be equal flexibility at the initial stages of the process, from the very first collection of the sample onward through each stage of the Unit's function. Because of the long term nature of the work of a genetic resources centre, it is not possible to foresee every requirement, and for this reason there must be the concept of flexibility in the documentation function to make future additions and changes possible.

These concepts were impressed upon the staff of the Unit, and it is my firm belief that they are now in a position to proceed with their valuable work. Without exception, from Director to technician, I found the staff intelligent, capable, and imbued with a desire to carry on their duties.

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FOOD AND AGRICULTURE ORGANIZATION
OF THE UNITED NATIONS

Via delle Terme di Caracalla, 00100-ROME

Cables: FOODAGRI ROME

Telex: 61181 FOODAGRI

Telephone: 5797

Ref. PE 13/1 Rogers

13 June 1973

Dear Mr Rogers,

We have sent the following cable to Mr Buchanan
on 5 June:

"GRATEFUL ASCERTAIN AVAILABILITY DJ ROGERS WHO
ALREADY WORKED APRIL 1972 AND OFFER ONE MONTH
CONSULTANCY IZMIR TURKEY ADVISE DOCUMENTATION
PLANT GENETICS COMMENCING POSSIBLY 15/6 STOP
SALARY DOLLARS 1750 PERMONTH PLUS DSA STOP OFFER
SUBJECT GOVERNMENT CLEARANCE MEDICAL CERTIFICATE
LOYALTY CLEARANCE STOP ROGERS BORN 19 OCTOBER 1918
DE FUNIAK SPRINGS FLA ADDRESS TAXONOMETRICS LABORATORY
DEPT EPO BIOLOGY UNIVERSITY COLORADO BOULDER COLORADO
80302 STOP OFFER FOLLOWS".

and we have then sent the offer of appointment through
Mr Buchanan.

By his memorandum dated 4 June Mr Buchanan has
informed us that, following exchange of cables with
Dr. Kjellqvist, you have travelled to Izmir anticipatedly,
without receiving our travel authorization and loyalty clearance
and without providing us with a medical certificate.

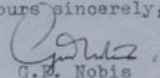
To partially remedy, we have sent you a cable to
Izmir on 11 June:

"GRATEFUL CABLE YOUR ACCEPTANCE OUR OFFER AND
WORDING LOCAL MEDICAL CERTIFICATE STATING RELEASING
PHYSICIAN ENABLING US AUTHORIZE PAYMENT DSA"

We hope that you have already followed this matters up
and are sending you herewith enclosed another offer of appointment
in duplicate and we should be grateful if you would send us back
one copy signed as soon as possible.

Upon your arrival in Rome for debriefing during the
first week of July, your travel expenses will be settled.

Yours sincerely,


G.M. Nobis
Personnel Officer

Mr DJ Rogers
UNDP/SF TUR/63/508
P.O. Box 25, Karsiyaka, Izmir

Agricultural Research and
Introduction Centre
P. O. Box 9, Menemen
Izmir, Turkey

29 August 1973
TUR/8-418

Dear Dave,

At long last you will get a sign of life from this end. The reasons why you have not heard from me so long are uncertainties about the future as well as the intensive collecting activities since you left. The situation today is, by no means, clear but the major problem that we were facing when you were here in Izmir, has been resolved. I enclose a photocopy, for your personal information, of a letter written by the Resident Representative of UNDP in Ankara to Jorge. This letter pictures in a nut shell the current situation.

I am leaving on Sunday for a seminar in Kairo. This seminar will also be attended by Jorge, so indeed I look forward to this seminar, particularly with the opportunity thereby provided by discussing various important aspects with him.

On August the 1st, DG himself of FAO made a private visit to the Institute. This was done in connection with a vacation trip. Boerma himself was undoubtedly very interested and impressed with the accomplishments so far and seem to have a real interest and concern about the permanent solution of the whole plant germplasm problem.

I have read your letter written in Nigeria with real interest and I look forward to discuss with Jorge the data on the collection record. I only regret that he has not said anything of this sort to me at any occasion, particularly since there is nothing as useful as exchange of views and ideas. I have also talked to soils experts and got the impression that the descriptors as we have them on the record should be meaningful. When Jorge tells you that the general format of the collection record is that proposed by Erna Bennet, I am sorry he is wrong. Erna has not produced any original collection record which should have been copied over here. On the contrary, the very first record, I have produced and this one Erna has used in FAO. This, however, is of no real importance who has done what. The main thing is that we will end up with something practical and meaningful.

./...

Ayla and myself have used the present form this summer and are, on the whole, pleased and happy with it. We have had along two of Jack Hawkes' future M.Sc. students for a month. One Afghan and one Iranian girl; both of them are very interested and pleasant, and will undoubtedly fit in the future project.

I have also read your consultant report which I think is very good. I do not want to make any alterations or additions. I will make a photocopy of your report and keep for myself, and give the original to Jorge.

Dr. Beringer, who is FAO Country Representative in Turkey, was visiting the Institute two days ago. He also read your report and had the same opinion about it as I do. As a matter of fact, Dr. Beringer wants to annex it to his semi-annual report, which he will have to submit to both Rome and Newyork. This, however, I do not want to be done before I have obtained concurrence for it by Jorge.

I am afraid this has already become a too long story why I better sign off here.

With very best regards from Prof. Tayşi, Ayla, Nedret, Kaya and myself,

Sincerely,



Dr. EBBE KJELLQVIST
Project Liaison Officer

ps. After Kairo seminar, I will write you again.

Prof. D. J. Rogers
Professor of Biology
Department of Environmental
Population and Organisms Biology
University of Colorado
Boulder, Colorado 80302
U. S. A.

EK/ct



DEVELOPMENT PROGRAMME IN TURKEY

CABLES : UNDEVPAO, ANKARA
TELEPHONE : 12 10 42 / 51 / 59

F. O. BOX 407
ANKARA, TURKEY

REFERENCE :

SH/aa

S-6-P/8

18 August 1973

Letter No. 703

Dear Dr. Leon,

Inter-country Project - Plant Genetic Resources

In the past few weeks I have spent considerable time on the above-mentioned project both here in Ankara and in Izmir.

I wish to tell you first of all that I now have a firm promise from the Government that their letter of intent, approving the project in principle and permission to make the facilities in Izmir available, will be in my hands in a few days' time.

The Government has a couple of reservations concerning (a) maintenance and replacement of equipment to be made available, and (b) the omission of fellowships for Turkish students. With respect to (a) they feel that some provision in the budget should be made so that equipment which is damaged or expended, can be replaced. In the case (b) it is pointed out that even if the professional and technical staff necessary to be recruited in Turkey does exist, there is no possibility for replacement in case of for instance death, accident, marriage, child-birth and what have you. Therefore a second batch should be trained under the project.

For my part I feel that the Turkish authorities are justified in being concerned about these two matters and therefore believe they should be taken into account in a revised budget for the inter-country project.

s/

Dr. J. Leon
Chief
Crop Ecology and Genetic resources Unit
Plant Production and Protection Division
FAO - Rome

cc: Mr. A.M. Bosma
Mr. E. Kjellqvist

While in Izmir a few days ago I was in telephone contact with SIDA in order to solicit information about the recent meeting of the Consultative Committee. I learned that the Committee now has decided to set up a sub-committee which will meet in September to review financial and other questions relating to the creation of a global system of gene centres, where the Izmir centre would have first priority. I was told that there was 95% certainty that the Consultative Committee would take a positive decision in November on the financing both of the global system and the Izmir centre. The Swedish Government was now prepared to make a financial contribution to the Consultative Committee for this purpose and that this would exclude any direct financing through the FAO/SIDA Cooperative Programme of the Izmir inter-country project.

In this situation I am of course pleased, on one hand, that a more permanent solution of the gene bank question now seems to be imminent. After all the SIDA arrangement was of an interim nature, which might still leave us uncertain about the future after five years. On the other hand, I am concerned that financing through the Consultative Committee does not entail a redesign of the project as such, since it is on basis of this proposed structure and pattern of activities that six countries have declared themselves willing to cooperate and participate. Whatever light you can throw on this question would be most welcome.

Furthermore, it is my understanding that the Consultative Committee would charge FAO with the execution of the project. I take this to mean that time-honoured principles of multilateral project design, backstopping and administration would apply?

Finally, I am concerned that the new situation seems to render the dispatch of the first group of students to Birmingham in October of this year difficult, resulting in another year's delay in the start-up of project operations in all the participating countries. Do you see any solution to this problem?

With best regards,

Yours sincerely,

Sören Happling
Resident Representative

Priority jobs

- 1. Collection record
- 2. Aylis morphology forms -
3. Storage records (locality in the store)
- 4. Transfer old site card data to punch cards.
- 5. Germination records, viability + regeneration
- 6. Label printing (for storage & herbarium).
7. Distribution maps
- 8. How to record chromatographic data.

International Institute of
Tropical Agriculture
Ibadan, Nigeria
July 9, 1973

Dear Ebbe and Ayla:

This is the first opportunity I have had to write you since arriving on June 25 from Rome. I take this opportunity to share with you some of the observations and conversations I had with Jorge Leon.

First, the new positions have still not been formally announced, (or had not been when I left) but they expected to have them out early in July. They may have been by now, but I have had no mail from home since I left. The reason for the delay, according to Jorge, was that they needed to have one statement appended to the announcement which had previously not been included, and that statement had to say something to the effect that the position was "pending final approval of the Council". Since the Council does not meet until next November, there is still only the informal commitment from Albani and Leon that I will indeed have a job beginning next January. This leaves me in a very precarious position, because I had to tell my University in Colorado that I definitely would be on leave without pay, starting next January. If something happens so that the Council does not approve the position, then I will be out of a job in January. I have, therefore, taken a pretty large personal risk in this matter. If something does happen to the position, you may be sure that I will raise hell with those in FAO who are responsible.

Second, with respect to the job of collecting, Jorge has some ideas which you should know about. The most critical comments deal with the collecting record itself. It is Jorge's judgement that there are too many requirements on the ~~xxxx~~ form, even as we reformulated it, and that you do not have time to gather much of the information you have listed. He is particularly critical of the soil descriptors, and says that the information you want to gather is not sufficiently specific to be meaningful. He bases the comments on the soils upon his discussions with a tropical and subtropical soils expert, and a rebuttal of his arguments may be difficult. He says that the general format of the collecting record is that originally proposed by Erna Bennett, and that it goes against the philosophy and objectives of the whole program. The objectives are to gather "millions" of seeds, and that this objective overrides any other one. With this objective, he says that you simply do not have time to record more than locality, date, and local names.

I tell you the above simply because you will find his arguments very powerful, and a reflection of many others whose attitude is similar in this business of conservation of genetic resource conservation. I think, for example, that in this respect, Otto probably agrees with Jorge, and not with Erna. There must be some resolution

of the different attitudes before it becomes an argument in the political arena. There are arguments of value on both attitudes, and probably there can be some middle ground, if all are willing to express their views logically and objectively. You will recall the attitude of the English ~~plant~~ wheat breeder (whose name I cannot recall) who was at the Institute the day I arrived. All he wanted was the locality from which each accession came. But no one argument is worth anything unless the objectives of the program are well stated, and the arguments addressed to these objectives.

I suggest, therefore, that you take time to restate to objectives for which your section is responsible. After stating the objectives, then you can objectively marshal your arguments for the data which you find necessary to include. You should establish priorities, and tell how your data can be gathered to meet these priorities. With such a statement of objectives, priorities, and necessary data, you are on much firmer ground to win your case than if you only present it on an emotional ground.--Much of the argument has been emotional, and not realistic evaluation.

I am very eager to hear of the final outcome of the battle you and Prof. Taysi were waging when I left. I feel confident that it will come out all right, even though it is unpleasant to have to continue to spend valuable time and energy on such matters.

Lastly, let me express my great appreciation for the very cordial welcome you gave me while there. Both of you, as well as Prof. Taysi, did such a fine job in my behalf that I shall always be indebted to you. I only hope that we will be able to continue working together for a long and productive time. I was very impressed with the work you have already done, and the very professional way in which you are proceeding. My very best regards to all, especially to Nedret.

Very Sincerely,

David J. Rogers

Specifications for printing storage labels.

Input format: free-field.

Descriptor--within the free-field form, one descriptor field is determined by position of commas (,) following each descriptor field.

Following last descriptor field for each item is an asterisk (*). there are N - 1 commas for each item.

Each new item is started on a new card. That is, there will be (or may be) trailing blanks after completion of each ~~entry~~ item.

Series of commas indicate no information for a particular descriptor field.

Format of output: See example of label (attached)

Print on each label the following descriptors

Number of Descriptor	Descriptor name
1	ACCESSION NUMBER
2	GENUS
3	SPECIES
6	ROOM NO.
7	BLOCK NO.
8	PARCEL NO.
9	DRAWER NO.
10	BOX NO.

On each label, print the above in the following line sequence

line 1--ACCESSION NUMBER

line 2--GENUS and SPECIES

line 3--ROOM NO. BLOCK NO. PARCEL NO. DRAWER NO. BOX NO.

The formate of the free-field format is attached.

An example of a finished label is:

TR5573-66
TRIFOLIUM ANGUSTIFOLIUM
IA020510

Note: on Line 2, there is a blank between the descriptors.

MAKE 8 COPIES OF EACH LABEL

THE CONCEPTS AND APPLICABILITY OF TAXIR FOR STORAGE AND RETRIEVAL OF GENE
BANK DATA

Outline of presentation by David J. Rogers at EUCARPIA Meeting

IZMIR, TURKEY

April 11, 1972

"The taxonomist should be in a position to provide a system in which all further information can be accommodated and which has a high predictive value. Such a system should act as an efficient data storage and retrieval framework."

J. G. Hawkes in Frankel and Bennett, Genetic Resources in Plants--Their Exploration and Conservation, Blackwell, 1970, page 83.

1. The above quotation is prophetic. The same spirit guided the development of TAXIR--TAXonomic Information Retrieval.
2. The portions of taxonomy that serve as a model.
 - A. The typical reporting methods of taxonomy as an effective information retrieval system.
 - B. Taxonomic terms reinterpreted for information retrieval purposes.
 - 1) Key: A binary searching and identification routine.
 - 2) Taxonomic Character: A single basis for description, defined over the set of objects to be described. (We use the word descriptor to mean the same as character).
 - 3) Character State: For the individual specimen being described, a precise term is given. This becomes a descriptor state.
 - 4) Taxon: An item forming the basis for description.
 - 5) Species (Taxon) Description: A condensed abstract of knowledge (using descriptors) about an item.
 - 6) Hierarchical Classification: A method of organizing data banks with varying levels of detailed description.
 - C. Data, when interpreted (or placed into a specific context) becomes information.
 - D. TAXIR will process either data or information.

3. Description of the TAXIR System, using an example of an actual gene bank situation. The Plant Introduction Station, USDA, Pullman, Washington, Dr. Sam Dietz, Director, for data on Phaseolus species accessioned (approximately 6,000 accessions).

FIRST STAGE--Pre-TAXIR Activities

Director of gene bank wishes to install a system to store and retrieve data on accessions of genetic materials.

QUESTION: Can we afford it?--See attached comparison of manual versus TAXIR Systems.

QUESTION: How many accessions in bank at present?

QUESTION: What is yearly average accession rate?

QUESTION: Is a new program of exploration and introduction anticipated?

QUESTION: If a new system is to be installed requiring computing facilities, how do we arrange for them?

QUESTION: How much descriptive information (how many descriptors?) necessary for crop material? Refer to Professor Konzak's Standardized Format for Small Grains.

Assume that all above questions answered satisfactorily.

SECOND STAGE--Pre-TAXIR Activities

Development of necessary descriptive information about accessions.

1. Develop descriptor list: The following is an extracted example:

A. Identification of each accession

- a. Introduction number
- b. Scientific name
- c. Common name(s)
- d. Cultivar name
- e. Date of initial introduction
- f. Date of sending out propagation materials to specialists., etc.

B. Locating information

- a. Country of origin
- b. State/Province of origin
- c. Precise locality
- d. Collector
- e. Collector number
- f. Date of collection
- g. Type of propagule, etc.

C. Morphological descriptors

- a. Habit
- b. Stems
- c. Leaves
- d. Flowers
- e. Fruits
- etc.

D. Genetic/plant breeding data

- a. Appropriate descriptors for crop, etc.

E. Cultivation requirements

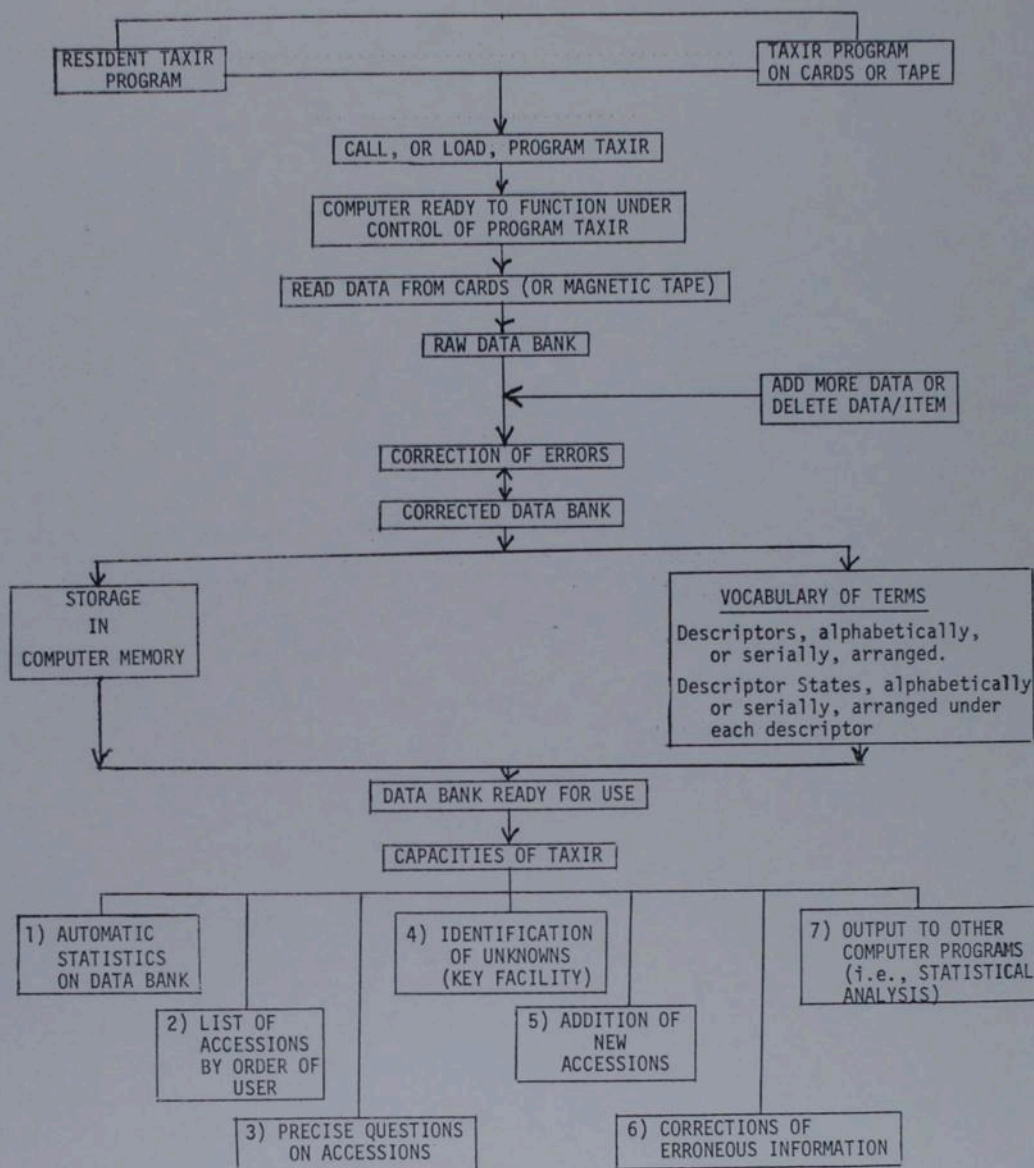
- a. Appropriate descriptors for crop, etc.

NOTE: Each lower case letter above indicates one descriptor.

THIRD STAGE--Data Capturing (or preparation)

1. Discover most efficient data gathering procedures.
 - A. Preprinted, tabular format?
 - B. Prepunched (Port-A-Punch) IBM cards?
 - C. Standardized notebook.
2. Have accession numbers been assigned to individual items in gene bank?
3. Are the individual accessions to be the items described?
4. Are data-gathering personnel trained in descriptive methods?
5. Has descriptor list been checked with TAXIR specialist.
6. Have facilities to key-punch data on IBM cards been established?
 - A. Rental basis
 - B. Use of other organizational facilities.
7. Are TAXIR computer programs installed in resident or rented computers?

FOURTH STAGE--TAXIR Processing



- 1) Automatic Statistics on Data Bank: The system can printout statistics on accessions such as total items in the data bank, number of accessions from a given geographical area, number of accessions belonging to a given taxon, etc., etc.
- 2) Lists of Accessions by Order of User: The system can generate catalogs, (or lists), employing data organization capability of TAXIR.

EXAMPLE: All the germ plasm accessions in the bank from a specified geographical area can be selectively retrieved from the bank using Boolean capability of the system, and the information on those accessions (such as accession number, taxonomic name, bio-chemical properties, etc., etc.) can be organized and printed out in any desired format.

- 3) Precise Questions on Accessions: Through the use of the selective retrieval capability of the TAXIR system, germ plasm possessing a specified combination of qualities can be searched and located.

EXAMPLE: The plant breeder desires to have germ plasm of *Phaseolus* species which gives white seeds with bushy plant habit adapted to warm dry climates.

- 4) Identification of Unknowns (Key Facility): The phenotypic data on the accessions within TAXIR bank allows taxonomic identification of the unknowns. The use of the TAXIR system as a simultaneous key obviates the difficulties imposed by the conventional dichotomous indented keys, in identifications.
- 5) Addition of New Accessions: The information bank remains open ended, and the TAXIR system can add new information on accessions already in the bank (e.g., use of a given donor parent in a plant breeding program which will generate more cytogenetic data) on that accession. This information can be easily incorporated into the TAXIR bank. New accessions may be added as information becomes available.
- 6) Corrections of Erroneous Information: The TAXIR system can be commanded to search and correct data in the bank. This is a type of editing routine.
- 7) Output to Other Computer Programs (i.e., Statistical Analyses): Output to other programs such as Chi Square Regression Analysis, Cluster Analysis, Character Analysis, etc.

SUMMARY OF TAXIR

The TAXIR (TAXonomic Information and Retrieval) program is a part of a series of functions, analytical and synthetic programs incorporated in the design of a communication and information system. It embraces a set of 18 independent control statements, which when used in a selected series, perform functions useful in structuring, archiving, organizing, manipulating, changing, and creating data to the desired specifications of the user. The usefulness of TAXIR as a module of a data management system may be expressed as follows:

- o TAXIR is organized and designed to take advantage of the logical capabilities of Boolean Algebra thus allowing for efficient use of intricate and involved inference and demonstration criteria.
- o TAXIR stores the data bank as basic characteristic codes or functions. This technique enables information to be compressed logarithmically into bit representations in the computer and also facilitates Boolean expressions of search criteria to be executed through calculations rather than traditional file searching. This method of storage and information retrieval is a great saving in computer memory and time.

TAXIR COMMANDS

The following brief discussion of TAXIR commands is intended to explain some of the data maintenance, conversion and executive features of the TAXIR computer program.

Any "thing" that may be detailed, particularized, or described, will be called an item with the understanding that a descriptor is a basis or a structure for comparing these items. Specific statements regarding any item are states assignable to a descriptor.

Descriptor states for each item are input sequentially, separated by commas, in any of the mediums (cards, magnetic tape, paper tapes, teletype, etc.) acceptable to computers. The command: DEFINE ITEMS will read in, store, order, etc., the raw data into the computer in a format suitable for manipulation. The input data are screened for certain types of errors of omission or commission and these items will be automatically excluded from the data bank. The user is advised of this for each exclusion. A print-out of the entire input bank is provided if the user desires.

COMMAND DEFINE DESCRIPTORS

This command with its accompanying definitions enables the user to design and build his information bank to his specifications. For instance, if a descriptor is specified as a "name" descriptor, the descriptor states are likely to be nouns or adjectives in some written language. TAXIR will construct the appropriate files for the dictionaries and the administration of these dictionaries (ordering, synonymy, etc.). If a descriptor is described as "coded", it will expect something of the nature of 1, 2, 3, etc., as input for a particular description with the instruction to permute and replace the 1, 2, 3, etc., by red, white, blue, etc. A "FROM-TO" type descriptor allows ranges of numbers to be specified such as all flocks of birds between 1,000 and 4,000, to temperature between 25°F and 25.8°F. The EQUALS facility enables the user to use the same dictionary for more than one descriptor.

The command HOW MANY simply prints out the count of the number of items that satisfy the query.

The command PRINT may be formulated so that a single item, all the items, and/or a series of complex restriction conditions employing the AND, OR, NOT and the parentheses of Boolean expressions will be printed out on any of a number of peripheral processors (printers, CRT tubes, etc.).

GENERATE is a TAXIR command that will printout on a magnetic tape the selected information for input in 15 or so statistical programs.

A series of commands are available for the maintenance of a data bank such as CORRECTION, DELETE STATE, DELETE ITEMS and DEFINE MORE DESCRIPTORS. It is also possible to create new descriptions from old information already input to the bank.

A number of other commands (a total of 18) are useful in data management such as MEMO, TIME, ETC.

A series of error messages (78 in number) are also incorporated in the program. These inform the user of errors of commitment on his part or of errors in the data and are useful in editing the information in the bank.

COMPARISON BETWEEN MANUAL DATA FILING SYSTEM AND
TAXIR SYSTEM

<u>MANUAL</u>		<u>TAXIR</u>
1. Data to be filed arranged under limited number of prechosen index headings: 1. Alphabetic 2. Geographic 3. Taxonomic classification 4. Subject headings 5. Numerical	← →	1. Data to be filed arranged under any number of index headings. Gene bank director and scientists choose all desirable headings. Additional file headings may be added at will. All files automatically cross-referenced.
	} All require cross-referencing system.	
2. Each file requires a separate physical file, thus, much duplication of each item added to the files.	← →	2. Each datum recorded but once, eliminating need for duplicate effort.
3. The separate files listed above cannot be ordered into one overall file.	← →	3. All files ordered together in one operation, all under one program command statement.
4. Great difficulty extracting additional data which does not fall into a major file heading.	← →	4. Each datum individually addressed not dependent on a major file heading.
5. Once established, reorganizing files into a different filing scheme is costly and time consuming.	← →	5. Any desired changes in file organization accomplished with one computer program instruction.
6. No possibility of guaranteeing precise and accurate responses when a question is asked.	← →	6. Automatic searching of data file extracts all pertinent responses, without missing any one.
7. Time to search complete file is prohibitive.	← →	7. Time to search complete file measured in seconds.
8. Little possibility of keeping statistics on file contents.	← →	8. Constant count of data items in file.
9. Difficult correction, deletion, or updating files.	← →	9. All corrections, deletions, updating of files made accurately and instantly with one program instruction for correction, one for deletion, and one for updating.

ID TAXIR *

SAMPLE QUESTION FROM PHASEOLUS GENE BANK, USDA REGIONAL PLANT INTRODUCTION STATION, PULLMAN WASHINGTON

QUERY FOR BOB MCMILLAN U OF FLA LIST ITEMS WITH SEED COLOR, B*

RESPONSE:

109860	136744	140311	150400	150404	150408	150413	150417	150957	152326
155213	163556	163566	163583	164616	164739	164777	165417	165419	165420
165422	165433	165434	165435	165453	165455	165461	165462	165466	167107
169730	169758	169767	172020	173041	173046	174908	175257	175261	175849
175859	177051	181784	181796	182983	186502	186504	186505	189011	189014
189414	189568	190070	190072	190073	190076	194573	194579	194530	194581
194582	194583	194587	195347	195354	195355	195361	195364	195368	195369
195370	195371	195374	195384	195391	195397	195398	195799	195802	196927
197446	197967	199038	200940	200947	200956	200959	200962	200967	200968
200969	200974	200999	201300	201324	201326	201333	201365	201378	201483
201493	201495	202081	203916	203918	203923	203924	203927	203958	204963
205361	207141	207175	207186	207198	207226	207227	207228	207229	207231
207233	207276	207283	207284	207299	207331	207372	207373	207391	207408
207409	207410	207422	207586	207832	208768	208769	209461	209465	209472
209475	209496	209621	209801	209811	212021	212024	224714	224717	224729
224743	226916	230364	251049	268108	268110	276327	278669	280655	281594
282101	282108	282117	287536	288013	288014	288015	288016	288017	288018
288019	288605	289339	289383	289409	289414	289422	289455	289470	298111
300655	300656	300657	300658	300660	300662	300663	300664	300665	300666
300668	300669	300672	300673	300674	300675	300676	300677	300679	300680
300681	300682	300685	302530	303639	304108	304109	304111	304112	304116
304117	306154	306155	306158	306159	306160	306161	306162	306163	306164
306165	306167	306171	207435	249553	269325	311175			

NO. OF ITEMS IN QUERY RESPONSE = 227

END*

TO TAXIR *

SAMPLE QUESTION FROM PHASEOLUS GENE BANK, USDA REGIONAL PLANT INTRODUCTION STATION, PULLMAN, WASHINGTON

QUERY FOR DAVID L ROGERS LIST ITEMS WITH PLANT HABIT, B AND POD LENGTH, FROM
5 TO 8 AND SEED COLOR, W*

RESPONSE:

137117	164926	169838	169843	169848	169869	169920	174996	179440	180732
180748	180751	180752	180754	180755	180759	180761	181919	197225	205213
206986	212025	212026	226931	226937	271994	271995	271997	272004	285693
289380	289423	289424	289426	289430	289435	289438	289441	289443	289450
289451	289464	289473	289475	302539					

NO. OF ITEMS IN QUERY RESPONSE = 45

SAMPLE QUESTION FROM PHASEOLUS GENE BANK, USDA REGIONAL PLANT INTRODUCTION STATION,
PULLMAN, WASHINGTON

ID TAXID *

QUERY PRINT: COUNTRY OF ORIGIN AND PLANT HABIT AND DAYS OF MATURITY FOR
ITEMS WHICH HAVE SEED COLOR, **

RESPONSE:
ITEM NO.

REQUESTED STATES

109860 VNZ , SV , M

136744 CDA , R , M

140311 IRN , SV, UNKNOWN

150400 ELS , V , M

150404 ELS , SV, M

150408 ELS , SV, M

150413 ELS , R , M

150417 ELS , SV, M

150957 MEX , SV, L

152326 ECD , SV, M

155213 PRG , SV, UNKNOWN

163556 GTA , V , M

163566 GTA , R , M

163583 GTA , B , M

164616 IND , SV, M

164739 IND , SV, M

164777 IND , SV, M

165417 MEX , SV, M

165419 MEX , SV, M

165420 MEX , SV, M

165422 MEX , SV, M

165433 MEX , SV, M

165436 MEX , SV, M

165435 MEX , SV, M

165453 MEX , V , M

165455 MEX , SV, M

*An easy way to pick up blanks is
our data*

Salween, Myanmar
H-166, Cambodia
Phum, Cambodia

SAMPLE QUESTION FROM PHASEOLUS GENE BANK,
USDA REGIONAL PLANT INTRODUCTION STATION,
PULLMAN, WASHINGTON
ID 13314

QUERY HYLAND WEST MALAYSIA 4 27 71 PRINT: COUNTRY OF ORIGIN FOR ITEMS WITH
PLANT ERECT, 5 AND
SEED SIZE, W AND
DAYS OF MATURITY, E*

RESPONSE:
ITEM NO. REQUESTED STATES

128513	USA
136659	CGA
136729	CGA
136745	CGA
209806	KYA
223359	IRN
226931	GMN
226938	GMN
271958	SPN

NO. OF ITEMS IN QUERY RESPONSE = 9

END*

ID TAXID *

SAMPLE QUESTION FROM PHASEOLUS GENE BANK, USDA REGIONAL PLANT INTRODUCTION STATION, PULLMAN WASHINGTON

QUERY FOR BOB McMILLAN U OF FLA LIST ITEMS WITH SEED COLOR, 0*

RESPONSE:

109860	136744	140311	150400	150404	150408	150413	150417	150957	152326
155213	163556	163566	163583	164416	164739	164777	165417	165419	165420
165422	165433	165434	165435	165453	165455	165461	165462	165466	167107
169730	169758	169767	172020	173041	173046	174908	175257	175261	175849
175859	177051	181784	181796	182983	186502	186504	186505	189011	189014
189414	189568	190070	190072	190073	190076	194573	194579	194530	194581
194582	194583	194587	195347	195354	195355	195361	195364	195368	195369
195370	195371	195374	195384	195391	195397	195398	195799	195802	196927
197446	197967	199038	200940	200947	200956	200959	200962	200967	200968
200969	200974	200999	201300	201324	201326	201333	201365	201378	201483
201493	201495	202081	203916	203918	203923	203924	203927	203958	204963
205361	207141	207175	207186	207198	207226	207227	207228	207229	207231
207233	207276	207283	207284	207299	207331	207372	207373	207391	207408
207409	207410	207422	207586	207832	208768	208769	209461	209465	209472
209475	209496	209621	209801	209811	212021	212024	224714	224717	224729
224743	226916	230364	251049	268108	268110	276327	278669	280655	281594
282101	282108	282117	287536	288013	288014	288015	288016	288017	288018
288019	288605	289339	289383	289409	289414	289422	289455	289470	298111
300655	300656	300657	300658	300660	300662	300663	300664	300665	300666
300668	300669	300672	300673	300674	300675	300676	300677	300679	300680
300681	300682	300685	302530	303639	304108	304109	304111	304112	304116
304117	306154	306155	306158	306159	306160	306161	306162	306163	306164
306165	306167	306171	207435	249553	269325	311175			

NO. OF ITEMS IN QUERY RESPONSE = 227

END*

ID

TAXID

*

SAMPLE QUESTION FROM PHASEOLUS GENE BANK, USDA REGIONAL PLANT INTRODUCTION STATION, PULLMAN, WASHINGTON

QUERY FOR DAVID L. ROGERS LIST ITEMS WITH PLANT HABIT, B AND POD LENGTH, FROM
5 TO 8 AND SEED COLOR, W*

RESPONSE:

137117	164926	169838	169843	169848	169869	169920	174996	179440	180732
180748	180751	180752	180754	180755	180759	180761	181919	197225	205213
206986	212025	212026	226931	226937	271994	271995	271997	272004	285693
289380	289423	289424	289426	289430	289435	289438	289441	289443	289450
289451	289464	289473	289475	302539					

NO. OF ITEMS IN QUERY RESPONSE = 45

SAMPLE QUESTION FROM PHASEOLUS GENE BANK, USDA REGIONAL PLANT INTRODUCTION STATION,
PULLMAN, WASHINGTON

ID TAXID *

QUERY PRINT: COUNTRY OF ORIGIN AND PLANT HABIT AND DAYS OF MATURITY FOR
ITEMS WHICH HAVE SEED COLOR, R*

RESPONSE:
ITEM NO. REQUESTED STATES

109860 VNZ , SV , M

136744 CDA , R , M

140311 IRN , SV, UNKNOWN

150400 ELS , V , M

150404 ELS , SV , M

150408 ELS , SV , M

150413 FLS , R , M

150417 ELS , SV , M

150957 MEX , SV , L

152326 ECO , SV , M

155213 PRG , SV, UNKNOWN

163556 GTA , V , M

163566 GTA , R , M

163583 GTA , B , M

164616 IND , SV , M *Salween, Madaya*

164739 IND , SV , M *H-sile, Bawdwin*

164777 IND , SV , M *Pinny Bawdwin*

165417 MEX , SV , M

165419 MEX , SV , M

165420 MEX , SV , M

165422 MEX , SV , M

165433 MEX , SV , M

165434 MEX , SV , M

165435 MEX , SV , M

165453 MEX , V , M

165455 MEX , SV , M

*An easy way to pick up blanks is
our data*

SAMPLE QUESTION FROM PHASEOLUS GENE BANK,
USDA REGIONAL PLANT INTRODUCTION STATION,
PULLMAN, WASHINGTON
ID 1331X

QUERY HYLAND WEST MALAYSIA 4 27 71 PRINT: COUNTRY OF ORIGIN FOR ITEMS WITH
PLANT EFFECT, S AND
SEED SIZE, W AND
DAYS OF MATURITY, E*

RESPONSE:	
ITEM NO.	REQUESTED STATES
128513	USA
136659	CCA
136729	CCA
136745	CCA
209806	KYA
223300	IRN
226931	GMN
226938	GMN
271998	SPN

NO. OF ITEMS IN QUERY RESPONSE = 9

END*

John Bingham
Pl. Bidey Incl.

~~St. 4~~

Maris Lane -
Trumpington
Cambridge,

Met in Izmir June, 1993

P.L. Breder - mostly *T. aestivum*.

Collection data only mildly interesting to him.
Suggests an collection data interesting in
resistance to shattering (perhaps better collected
by screening)

Brigham 6/9/73

Collection



Screening (collecting parent materials)



Breeding



-Temiz
Dr. Kasim - Asst Dir.

bitki = plant
istah = breeding
bölümü = section

Organization chart -

Adenin -
Prof. Tayyar - Dir.
Dr. Kasim Temiz - Asst Dir. (Pathology)

Pl. Genet. Resource Section
Dir. - Prof. Tayyar
(Ekke is FRG Liaison Advisor)

Introductory
Exploration taxonum - Ayk
Documentation - Nedret
Key punch operator
Typist

Herbarium
Chemistry
Cytology
Techa - Ahmed.

Conservation of Plant Genetic Res.
Kaya - in charge of gene bank
seed physiology etc.

Plant breeding Section -

Phytopathology + quarantine section - Dr. Temiz.

A REGIONAL PLAN FOR GERMPLASM COLLECTION, CONSERVATION AND EVALUATION

E. Kjellqvist

Agricultural Research and Introduction Centre, Izmir, Turkey

The Regional Plan includes Turkey, Syria, Iraq, Iran, Afghanistan and Pakistan.

It aims:

- (a) To carry out a systematic plant exploration programme in the participating countries on a cooperative basis;
- (b) To provide safe long-term storage of base collections in order to preserve the genetic resources of the region both for its own use and that of the rest of the world;
- (c) To provide a regional documentation centre;
- (d) To provide facilities for short-term storage of active collections and introductions in each of the member countries;
- (e) To provide regional cooperation in the evaluation and utilization of the germplasm material so collected.

The Plan envisages that each country will be engaged in its own section of a coordinated overall plan, concerned with plant exploration and utilization.

Active collections will be maintained as required in the countries concerned, and a complete set of all collections will be maintained under long-term storage at Izmir, Turkey, where facilities for this are already available.

The Documentation Centre will be maintained at Izmir also, with a computer-based information storage and retrieval system.

The activities to be carried out are as follows:

Beginning in 1974, for a period of five years, field exploration and collection activities would be organized in each of the member countries. The annual field exploration activities would be planned and executed with the assistance of an International Civil Servant, who would function as a coordinator. Collections would be made on an area basis and along ecological principles, though on an agreed priority basis.

./...

The collected material would be processed and all or part forwarded along with collection records and herbarium specimens to the Ismir Centre for long-term storage, final identification and documentation. The participating countries would, each, establish a germplasm unit (preferably in the agency responsible for plant introduction).

The combined seed collections would be available to all member countries and the International Community on request.

Subsamples of seed collections would be prepared at Ismir for safe keeping in other gene banks. Simultaneously, the Ismir Centre would be recipient of samples from other Regional Centres.

For ecological and genetical reasons, it is most essential that rejuvenation of seed stocks be done on a Regional basis. In order to maintain variability or prevent genetic change by selection in an environment to which the original samples were not adapted, they must be rejuvenated (i.e. grown again from seed) in the countries where they were collected and in an environment as close as possible to their original habitats.

It is also desirable that evaluation programmes be carried out on Regional basis so that the genetic potential of the material can be studied satisfactorily under as widely varied environments as possible. Proposed plan would provide a framework for just such an approach.

The countries involved in the plan, except Turkey, would provide two professionals each, who would receive training in exploration, processing and documentation techniques at Ismir, for a six weeks' period, starting in mid-July. They would, then, proceed to Birmingham, England, for the one year's M.Sc. course in "Conservation and Utilisation of Plant Genetic Resources".

Turkey would provide eight qualified professional staff members for the following posts:

1. Director for the Plant Genetic Resources Centre
1. Exploration - Taxonomy
1. Tree fruits exploration - Conservation
1. Rejuvenation - Evaluation of genetic stocks
1. Documentation
1. Seed Physiology - Long-term storage of seeds
1. Tissue Culture
1. Plant Pathology

./...

Annual meetings of the professional staff members involved in the execution of the project would be organized to develop annual work programmes and establish mutually advantageous working arrangements between the member countries. The venue for these meetings should rotate from country to country so that all will have an opportunity to evaluate the development situation in each, from year to year.

The Plant Genetic Resources Centre at Izmir is envisaged as the main centre within the Regional Plan. This Centre which started in 1964 as a joint project between the Turkish Government and UNDP/SF/FAO, is truly equipped and ready to take on such a function and responsibility.

The implementation of the Regional Plan would be done through a Managing Board, composed of representatives from the participating countries, preferably two from each country. These representatives would be responsible for their respective country programmes. The International Coordinator would primarily be responsible for the coordination of the programmes between the Centre and the units in the other member countries.

The execution of the Regional Plan would be kept under constant review by an International Scientific Advisory Council; such a Council is already set up for the Izmir Centre. This Council would also be represented in the Managing Board.

All the countries involved in the Plan are ready and willing to participate in the programme. All essential facilities are also available in the different countries; why it is today only a matter to secure required International funds to get the Regional Plan into action.



49.
AGP:SF/TUR 8
Mission Report

CROP RESEARCH AND INTRODUCTION CENTRE, IZMIR
T U R K E Y

REPORT OF REVIEW MISSION
(December 1970)

prepared by

Jack R. Harlan
Professor, Plant Genetics
University of Illinois
College of Agriculture

and

Edwin James
Former Head National Seed Storage Laboratory
USDA
Fort Collins, Colorado

FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS

Rome, 1971

WS/B4493

SUMMARY OF FINDINGS

1. The essential features of the PLAN OF OPERATION, UNSF PROJECT IN TURKEY: CROP RESEARCH AND INTRODUCTION CENTRE, IZMIR (7 December 1963) have been successfully realized.
2. The Centre as originally visualized is established and in operation, but certain action is still required before it can operate efficiently.
3. All the objectives outlined in the original plan should be achieved by the end of 1972 with the probable exception of collecting in countries other than Turkey.
4. The Mission finds that the Centre is prepared to serve the functions for which it was established.
5. If the Centre is to continue as an international Centre, it must continue to receive international support.

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Chapter 1

INTRODUCTION

1.1 BACKGROUND

A two-man mission, composed of Dr. Jack R. Harlan Professor in Plant Genetics of the University of Illinois, College of Agriculture and Dr. Edwin James, Former Head National Seed Storage Laboratory USDA - Fort Collins, Colorado visited Turkey in December 1970 in connection with the UNDP/Special Fund Project 'Agricultural Research and Introduction Centre, Izmir', which had been operational from 1964 to 1969.

The Plan of Operation gave the Centre the purpose of establishing a crop research and plant introduction centre in Turkey for the survey, collection, introduction, maintenance, selection, breeding and cultural study of valuable genetic material from Turkey and other countries of the Near Eastern region with a view to developing improved varieties of field, horticultural and industrial crops. In particular, it was to carry out the following functions:

- to survey and collect genetic material of herbage crops, cereals, fruits, oil crops, vegetables and selected industrial crops in Turkey and other countries of the Near Eastern region, and to maintain, study, select, test and improve this material for agricultural use under different conditions;

- to record, maintain, study, select, test and improve similar material collected during previous explorations in the Near Eastern region;

- to provide research training and experience to Turkish national scientific staff and to serve as a place where international specialists can study and investigate the collected plant material;

- to provide plant breeders in Turkey and other countries with seeds and other plant propagating material for breeding and research work.

Turkey and adjacent areas are enormously rich in genetic resources of cereals, forage crops, vegetables and pulses, tree fruits, forest trees and ornamental plants. Much of this immensely valuable material is threatened by serious genetic erosion or outright extinction which neither Turkey nor the world at large can afford to lose. The UNDP/SF Project TUR-8 was an expression of international concern in response to this critical situation.

It is unreasonable to expect Turkey to finance an international programme from her scarce resources. If the centre established at Izmir is to continue as an international centre, it must continue to receive international support.

1.2 TERMS OF REFERENCE

The mission was requested to:

1. evaluate the achievements of the project with regard to the collection, evaluation and conservation of native crop genetic resources. This evaluation would include the information available on the material collected in Turkey which had been evaluated and maintained in Izmir or in other institutions in the country or abroad, and on the utilization being made or planned of the genetic stocks.
2. review the request introduced by the Government of Turkey for UNDP additional support to the activities of the Germplasm Collection and Preservation Section of the Institute, from the technical and financial points of view so as to prepare a programme of work for the duration of the project which would make the best possible use of the resources allocated by both the UNDP and the Government of Turkey.
3. review the present structure and functioning of the Germplasm Collection and Preservation Section of the Institute with a view to identifying possible problems and make proposals for their solution. Special attention was to be paid to relations between the Section and the Plant Quarantine Services - especially with regard to international exchange of seed and plant material - and to the techniques of seed storage, including the physical facilities, the regeneration problems and the recording of information.
4. define the present and future action to be taken so as to upgrade the Section to the level of a Genetic Resources Centre on the basis of the criteria defined by the Fourth Session of the FAO Panel of Experts on Plant Exploration and Introduction (FAO, 1970) ^{1/} Special attention should be given to the present and future needs for additional facilities and equipment and for training of the Turkish staff assigned to the Genetic Resources Centre.
5. define the future role that the Izmir Centre can fulfill in a global effort for the preservation of the endangered genetic stocks in the world, for instance as part of a world network of genetic resources centres with full responsibility for the preservation of a range of species for which Turkey is a centre of genetic variability. In this connection, it should be ascertained whether the Government of Turkey would favourably consider Izmir as a genetic conservation centre for material collected in neighbouring countries.
6. outline a long-term programme in exploration, collection, evaluation, conservation and utilization of genetic resources based upon the findings of the Mission with regard to 4 and 5 above.

The itinerary of the mission is given at Appendix 1.

^{1/} FAO. 1970. Report of the Fourth Session of the FAO Panel of Experts on Plant Exploration and Introduction, Rome, Italy. 14-17 April 1970. AGP 1970/M/3. FAO, Rome. pp. 3-5.

Chapter 2

REPORT ON TERMS OF REFERENCE

2.1 ACHIEVEMENTS OF THE UNDP SUPPORT SF PROJECT

The Mission was briefed on several occasions on the history of the project. Details varied according to viewpoint and the individuals concerned, but there was a general agreement concerning the difficulties encountered. The overriding fact, however, is that despite these problems and frustrations, an Agricultural Research and Introduction Centre has been established at Izmir and is in operation.

Seed storage has been well handled even though cold storage space had to be rented and seed drying and packaging methods improvised. Some 7 700 collections have been made in Turkey and this collection is probably the best documented collection in the world with respect to voucher specimens and ecological information. A total of approximately 24 000 collections are in storage and about 6 000 have been distributed to other countries. Approximately 10 000 items have been distributed to other Turkish institutions for evaluation or use in breeding programmes. It is clear that collections are being made and seeds are moving both into and out of the Centre.

The many delays have put the operation of the Centre behind schedule, but it is established and operating. One might have wished for more collections in a period of six years. The seed collections in storage should have been repackaged and conveniently arranged by now, but delays in procurement of the storage cans are largely responsible for the fact that this job has not been completed. Lack of information and misinformation about long-term storage has brought about unnecessary work and unnecessary delays. If the present Mission had been executed much earlier, a great deal of time, effort, and money could have been saved.

With respect to the information available on the Turkish collection, there is: (1) a site description with some ecological information (see Appendix 2), (2) field notes and measurements taken on those accessions grown for increase at Izmir. It is expected that a considerable amount of information will accumulate on accessions evaluated in Turkey by collaborating institutions, but the programme is still too new for much to have been received. Requests are made for information on collections distributed to other countries but the response so far has been meagre. Again, it is too early to assess what the response will be when follow-up requests are made.

Information is at present being put on hand-sort cards for local retrieval, but it is proposed that within the time period of the UNDP/SF extension that it be incorporated into an international computerized information retrieval system.

The utilization of genetic stocks in Turkey varies, of course, with material and the activity of various breeding programmes. The wheat and barley breeding programmes are being revised on a national scale and a large volume of

materials has already been incorporated. Use of genetic stocks will be increasingly intense. Forage breeding and utilization programmes are also being upgraded and it is expected that extensive evaluation work will be underway in the near future. There is apparently every intention of utilizing the Turkish collections in Turkish research programmes to the fullest extent possible within the limitations of local research programmes. The interest in the material is high.

In comparing the achievements of the UNDP/SF project with the proposed Plan, some conspicuous deficiencies can be noted, but these are primarily due to lack of time and the delays in becoming operational. These include (1) no collecting teams outside of Turkey, (2) not enough training of Turkish personnel at the Centre, (3) evaluation of material is in very preliminary stages for the most part. The Centre has already been of service to teams of international specialists in their studies, investigations and collections of plant materials. In broad terms, the purpose of the project has been accomplished and the Centre as described in the Plan of Operation dated 7.12.63 has been established. Despite the many difficulties the project was successful. Attention must now be turned to sustaining support for the Centre now that it is established.

An encouraging development is the very close relations between the Centre and the Forest Service and the National Parks Department. Valuable populations of carob (*Ceratonia siliqua*) and walnut (*Juglans regia*) for example, have been identified and established as in situ reserves in National Parks. The possibility of additional conservation areas seems good. Most important, the local people are first convinced that they have something unique and valuable and take pride in their conserved areas. The public relations, so essential to effective conservation of reserve areas, is extremely well done. There are, in fact, signs everywhere that the Turks are becoming increasingly aware of the unique genetic resources in their country and of their enormous value to the world.

The most encouraging prospect of all, is the keen interest among Turkish administrators and research personnel in the programme and their intense desire to see that it continues on an international basis. The Turkish commitment is clearly illustrated by the fact that two collection teams were put into the field in 1970 after the termination of the project and with Turkish financial support. It is also important to note that the money for these collecting trips was not budgeted, but had to be raised by selling tomato seedlings, etc.

2.2 REQUEST FOR ADDITIONAL UNDP SUPPORT

The Mission reviewed the proposal for additional UNDP support in detail and recommended a substantially revised budget.

SUGGESTED REVISION OF BUDGET - UNDP SUPPORT

	U.S. \$
1 expert for plant exploration and taxonomy - 22 months	44 000
8 consultant months	16 000
72 fellowship months	36 000
Supplements for Turkish personnel in the field	5 000
Supplementary salary for bilingual secretary/typist \$ 70/month; 22 months	1 540
Supplementary salary for electrician, \$ 70/month; 22 months	1 540
Trip expenses, plant exploration	6 000
2 cars and trailers for exploration	10 000
Shipping costs	4 000
Running cold storage, 2 years	6 000
1 IBM punch machine	5 000
Herbarium cabinets and supplies	3 000
Additional equipment for photo laboratory	1 500
1 stereomicroscope	1 000
Convert one condenser to standby	500
1 silica gel dehumidifier	1 000
Literature (now very deficient)	7 000
Construct shelving, trays, etc. for seed store room	2 920
Flexible moisture proof seed packages	1 000
Chemicals and seed laboratory supplies	5 000
Glassware, film and misc. supplies	3 500
Punch cards	2 000
Printing of Index Seminum, distribution maps, etc.	4 000
Miscellaneous	14 500
TOTAL	182 000

Seed storage can be accomplished much more simply, practically and cheaply than calculated in the request, and one expert would be sufficient to achieve the programme outlined through 1972. Substantial reduction in these budget items makes it possible to allocate more funds for short term consultants, fellowships for upgrading competence of Turkish professional staff, shipping costs, salary supplements, literature, and expenses for collection teams.

It is specifically recommended that a seed storage expert visit the installation in 1971 and again in 1972 as a consultant and that an information retrieval expert be brought in for a few weeks to advise and train the documentation personnel.

While the revised budget comes to \$ 182 000 it is recommended that the UNDP request the Government of Turkey to add a line item of \$ 3 000 for the special purpose of assisting in the field training of students from the Near East who are likely to be involved in future work of germ plasm assembly and conservation. Looking forward to a possible regional development of plant exploration and conservation activities, it is not too soon to establish contact with personnel in nearby countries who will be engaged in this kind of work. The Centre at Izmir can usefully participate in the training of these people but since they are not Turks the State Planning Organization raised objections

to the inclusion of this item in the revised budget. They would, however, consider the matter favourably upon request of UNDP.

The revised budget indicates the nature of the work to be undertaken through 1972 as worked out jointly by the Mission and the Turkish administration. There should be adequate money to complete the plan as originally outlined. The two most urgent items are the repackaging and proper shelving of the seed stocks, and the entry of the documentation into a modern computerized information retrieval system. When these are done, the section should be able to operate smoothly and effectively to provide the services visualized in the original project.

2.3 STRUCTURE AND FUNCTIONING OF THE GERMLASM COLLECTION AND PRESERVATION SECTION

The structure appears to be satisfactory. Relations between the Section and the Institute are good. The only serious problem has been that of finances and the extension of the project should solve that problem through 1972.

The relations between the Section and the Plant Quarantine Services have also improved greatly in the last year or two. Movements of seed into the Centre and out of it are both reasonably free and reasonably controlled. If the activities of the Centre should increase substantially and a large volume of seed exchange be involved, it would be desirable to make some changes such as assigning a Plant Quarantine Pathologist to the Centre to expedite the flow of material. At the present time the procedures are not unreasonable.

The Mission is making specific recommendations with respect to seed storage (see 2.7). If these procedures are followed, the problems of regeneration of the long-term storage collection should be delayed for some 20 years or so and the Mission is not so clairvoyant as to foresee the situation at that time. Nor is it possible to predict the magnitude of the problem of maintaining adequate supplies of the working collections for distribution while some items will probably be in great demand, there may never be a request for other items. Some of the materials are being increased by cooperating Turkish institutions and some are being increased at Izmir. A good deal of material could, no doubt, be increased through informal arrangements with other programmes such as CIMMYT or individual breeders known to be reliable in Europe, Canada or U.S.A. This procedure would probably be preferable to the one originally incorporated into the "Acceptance Conditions for Obtaining Germ Plasm" (Appendix 3). It would not only make better public relations, but the regeneration would be under better control. It is to be noted that the "Acceptance Conditions" form is no longer used since the political climate that brought it into being no longer prevails.

2.4 ACTION REQUIRED TO UPGRADE THE SECTION TO A GENETIC RESOURCES CENTRE

The Section already qualifies in all essential points except that a duplicate collection has not yet been filed with another Centre. In the process of repackaging and arranging the collection it is recommended that small subsamples be drawn and sent to the U.S. National Seed Storage Laboratory for safekeeping. The shipment need not even be opened for at least 10 years and the cost in money and effort would be negligible.

The documentation should be put in better order and entered into an international information retrieval system. The process of upgrading the competence of Turkish personnel should be continued. What constitutes competence is, of course, a matter of opinion, but it is hard to get too much of it.

Facilities and equipment should be in excellent shape by the end of the extended period.

2.5 THE ROLE OF THE CENTRE IN A GLOBAL EFFORT FOR THE PRESERVATION OF GENETIC STOCKS

The seed storage capacity was overbuilt. There is space for the present collections of North America, Europe, and Asia combined. Since the facilities are there, it seems reasonable to make use of them as far as practicable.

A logical progression toward a global effort would be to use the Izmir Centre as a focus for a regional Near Eastern programme and then to integrate that into a global programme as one develops. The specific steps might be approximately as follows.

(1) Start a regional programme, requiring the participation of at least three countries. Perhaps, the CENTO nations of Turkey, Iran, and Pakistan would serve as the vehicle for launching a regional programme. At the same time, Syria, Iraq, Afghanistan and Ethiopia should be notified of the intent and the possibilities of participation. Indigenous collection teams should be used as much as possible, supported by international funds for training and field expenses. The long-term storage can be centered at Izmir, with international support for storage and distribution costs.

(2) As collections accumulate, the Centre at Izmir should deposit duplicate sets in other Centres for safekeeping. The U.S. National Seed Storage Laboratory, the National Centre in Bulgaria, the three proposed Eucarpia Gene Banks in Europe and the Vavilov Institute in Leningrad are suggested as possible Centres for cooperation. In turn, the Izmir Centre can serve as an alternate depository for collections from other Centres.

(3) Eventually, a truly global international network of Genetic Resources Centres may be established with full participation of the Izmir Centre. It is to be hoped that such a global programme would be organized under a special agency created by the UN for this purpose only and that it be responsible directly to the UN.

There is no question concerning "whether the Government of Turkey would favourably consider Izmir as a Genetic Conservation Centre for Material collected in neighbouring countries". The fact that the question was raised at all reflects the lack of understanding by UN/FAO of the realities in Turkey.

2.6 LONG-TERM ACTION PROGRAMME IN EXPLORATION, COLLECTION, EVALUATION, CONSERVATION AND UTILIZATION OF GENETIC RESOURCES

A general strategy is suggested in 2.5 above; details would vary too much from time to time and place to place to be appropriately developed in this report, but some general principles may be presented for consideration:

- (1) It is most convenient to think in terms of exploration and collection as one operation, conservation and distribution as a second operation, and evaluation and utilization as a third operation.
- (2) Exploration and collection must be undertaken where the germ plasma is to be found and can most efficiently be done by indigenous collectors. But, local collectors need training and support. They must be convinced of the potential value of their materials for both local and international programmes. Local interest in local material tends to increase as indigenous plant breeding programmes are developed, and the two are intimately related. It is unlikely that much local interest can be generated without local plant improvement programmes. Once interest is generated, however, systematic exploration and collection with indigenous personnel becomes possible. A modest amount of support in terms of encouragement, exploration costs, and training should bring immensely valuable results. Collection itself is relatively cheap and much of it can be done with local resources provided there is an interest. The material, once assembled should then be sent to Genetic Resources Centres for conservation and distribution.
- (3) The function of a Genetic Resources Centre has already been adequately defined (FAO, 1970). As far as long-term seed storage is concerned, it makes little difference where the storage is done as long as storage conditions are good and the viability adequately monitored. Working collections must be grown where materials are reasonably well adapted and where plant breeders can check changes that may occur in populations. Distribution for evaluation and plant breeding should usually be made from working collections only.
- (4) Evaluation and utilization are the business of plant breeding programmes. For some of the major crops that feed the world, these are becoming increasingly international in nature. The trend should make more effective use of resources possible and a freer flow of materials and information around the world. The effectiveness of Genetic Resources Centres should also increase as these developments continue.
- (5) The Mission cannot visualize an organization that could effectively conduct all three operations on a global scale for more than a few crops. It would be more realistic to concentrate on assembly, conservation, and distribution of genetic resources, and leave evaluation and utilization to local or international programmes that have been shown to be operationally effective in the past.
- (6) As suggested above, a global network of Genetic Resources Centres might be organized. Germplasm conservation is a matter of vital importance to the entire world and the problem should therefore be tackled in a truly international manner.

2.7 DETAILED RECOMMENDATIONS FOR SEED STORAGE AT IZMIR

2.7.1 Seed Preservation

From the standpoint of seed preservation the Plant Introduction, Exploration, and Taxonomy Section of the Agricultural Research and Introduction Center at Izmir, Turkey meets the requirements presented by FAO (1970), insofar as facilities are concerned.

The seed storage consists of five rooms of approximately 26 m² each. One room is designed to be maintained at a temperature of -15°C. for long-term seed preservation. Four rooms were to maintain a 0° temperature. The refrigeration system has no provision for humidity control, which is not necessary when seeds are stored in air-tight containers. The temperatures proposed for seed storage are lower than necessary for long-term storage of 15 to 20 years, perhaps with a few exceptions in regard to certain species.

Experience has shown that seeds with the shortest longevity under ordinary atmospheres can be maintained with little or no loss in viability for 10 to 15 years when stored at 10° and a relative humidity of 40-50%. There is really no long-term research which demonstrates how long seeds will maintain viability under controlled cold temperatures and low humidity. James Harrington of Davis, California, U.S.A. has proposed a "rule-of-thumb" for long-term storage which states that if the sum of the degrees F. and the percent relative humidity is 100 or less, conditions prevail that are satisfactory for long-term preservation of seeds. Storage experiments at the National Seed Storage Laboratory at Ft. Collins, Colorado, U.S.A. support this formula. With such a formula in mind, certain proposals are presented in the following which should obtain for increased efficiency and economy of operation of the seed storage facilities.

2.7.2 Seed Drying

In the absence of controlled low humidity in the cold storage rooms some provision must be made to reduce seed moisture to about 6%. Dependent on the season of seed collection many seeds would have a moisture content far in excess of this figure. On the other hand, seeds collected at very low humidities would probably have less. Even if collected in a dry state, seeds exposed to high relative humidities for a period of 24 hours would absorb sufficient moisture from the air so that supplementary drying would be required.

Drying at the Center is done in an oven with limited capacity which impedes the progress of storing both working and genetic stocks. Drying capacity can be immensely improved by the installation of a silica gel dehumidifier. A list of available makes in the States will be supplied to the Centre. Undoubtedly, similar units are available from some of the European countries. In the Seed Storage building a room of about 18 m² is available. This room can be closed off with the installation of a door to prevent the ingress of the exterior atmosphere and a dehumidifier installed. The dehumidifier should have the capacity to lower the R. H. to about 15-20%. Dependent on species, seeds if spread in a layer will equilibrate with the atmosphere from as low as 3.5% for most Brassicas to a maximum of 7.5% for *Abelmoschus esculentus*. Shelves can be constructed around the room where several hundred samples can be placed. Equilibrium with the low humidity should be achieved in no more than 48 hours for small seeds and possibly 72 hours or slightly more for large seeds such as *Pisum*, *Phaseolus* and certain Vicias and Vignas, etc. It is suggested to use the dehumidified room during all

seasons of the year in order to avoid outdoor drying which involves taking samples indoors at night and bringing them outside during the day. The transfer of seeds from the drying shelves to the storage cans should be done also in the dehumidified room.

2.7.3 Cold Storage of Seeds

The advice given to the personnel at the Centre regarding shelf arrangement in the cold storage rooms was unfortunate because the present installation allocates much more room to walkways than to storage. It is recommended that one room be used for storage of germ plasm and one for working stocks. To follow this recommendation a re-arrangement of the shelving is necessary. Instead of placing individual cans on shelves they should be placed in wood or pasteboard boxes with inside dimensions of 54 x 45 cm. The boxes would hold 30 cans of working stocks and 88 germ plasm cans. Each box would have a definite location in the shelves. Considering the number of cans in each box it would not be difficult to locate any accession as the need arises. Appendix 4 shows a proposed shelving arrangement for one of the typical seed storage rooms. The dimensions are optional, however, dependent on odd centimeters not accounted for in the plan. If the above is followed the two rooms suggested should serve the needs of the Centre for many years. If re-arranged ca 25 000 working stocks could be stored in one room and ca 75 000 germ plasm containers in the other.

2.7.4 Mechanical

The mechanical equipment for cold storage is of good design and more than adequate. A temperature of -15°C for long-term storage, however, is unnecessary. 0° is more than adequate but not undesirable. A considerably saving in operational costs would result by raising the storage temperature for long-term from -15 to 0 . Minor fluctuations, about $+ \text{ or } -2^{\circ}$ would occur but this would have no effect on seed life. Actually seed temperature would probably remain constant in spite of ambient changes. During the warm summer months a condensor would probably run continuously to maintain -15° and possibly so to even maintain 0° but in the cooler months the condensor would operate intermittently for a 0° temperature. With a higher storage temperature the kilowatt consumption could probably be cut considerably.

Working stocks could be stored at 10° with no ill effects provided the seeds are dried as described previously. This higher temperature would again lower operating costs. No factual figures can be given in regard to savings but it would be safe to estimate a third to two-fifths in electricity charges. These savings are reflected in the revised budget which is submitted. If only one room is used temporarily, which is possible, the operational costs could be further reduced.

In the Center's request for UNDP assistance, the request for \$ 5 000 for a reserve compressor can be allocated to a more useful purpose. Temporary inoperation of a condensor is not at all serious but if only two rooms are to be used for the immediate future, one of three unused condensors can be used for a standby. A competent refrigeration mechanic can make connections through a series of valves that will enable one standby condensor to serve the evaporator of any room in a series. The problems in such a series should be solved by a refrigeration engineer and the modification should cost less than \$ 500.

2.7.5 Seed Shipments

In the five years of the Center's operation, some 7 000 seed disbursements have been made under extreme difficulty owing to the fact that seed container delivery was delayed. There is a large backlog of collections to be canned and this work should receive high priority. The personnel at the Center proposes to place working stocks in small envelopes which may be removed from the cans as the need arises to fill seed orders. This procedure could be improved by placing the seeds in the storage cans in bulk. In this manner two advantages would result. First, the cans would hold a greater volume of seeds, thus extending the supply of the working stocks. Secondly, there will be little demand for many collections and the work involved in packaging prior to canning will have been wasted time. When seed orders are received, the cans can be removed from storage and allowed to come to prevailing air temperature and orders then filled in the dehumidified room.

Many flexible packaging materials are available which have excellent moisture barrier properties and a supply of these should be obtained for seed shipments. These are very inexpensive and could be sealed with equipment already on hand at the Center. Such flexible containers would protect the seeds from moisture absorption in transit, and could also be used for long-term storage when seeds are small and in small supply.

2.7.6 Germination and Reproduction

The present schedule at the Center provides for retesting the viability of seeds every two years. This period can be extended to every five or six years. Seeds of low viability should be considered unacceptable for storage and returned to the specialist who increased and evaluated the collection initially. Where this is not immediately feasible and considerable time is required for rejuvenation, low viability seeds can be stored and tested every two years. The documentation recorded on punched cards will serve to sort out those accessions which are critical in this respect.

Rejuvenation is of no immediate concern considering the probability that seeds under cold storage as explained above will maintain high viability for 15-20 years. The present arrangements for rejuvenation are excellent because they place this work in the hands of people who know the requirements of the various accessions which are and will be held in storage.

2.8 HANDLING ASEXUALLY PROPAGATED MATERIALS

At the present time the asexually propagated materials at Izmir are primarily tree fruits and grapes. The general procedure is to grow the materials in a nursery first for observation and to select disease-free scions for grafting on rootstocks in the collection nurseries. The procedure is all right except that it is easy to infect healthy material in the observation nursery and the collection nurseries are too close to the introduction gardens to avoid the spread of diseases.

The personnel at Izmir seem to be aware of the dangers and better isolation is being sought. The collections are relatively small at the present time and should not be difficult to manage for a few years. It is recommended, however, that an expert in maintenance of tree fruit collections be invited to Izmir

as a consultant and to inspect the present proposed procedures. The Mission does not feel qualified to give detailed recommendations on this matter.

2.9 TURKISH COUNTERPART FUNDS

The identification of counterpart funds related to international projects is extremely important to Turkish research workers. Regular appropriations may be cut on a percentage basis at almost any time, but counterpart funds are never cut and can be counted on. It is important, therefore, to encourage the fullest participation possible in internationally financed programmes.

The extent of Turkish commitment to the plant exploration and introduction activities is illustrated by the budget proposal for 1971-1973.

SUMMARY OF PROPOSED 1971-1973 BUDGET

<u>Personnel Expenditures</u>	<u>Number</u>	<u>Duration (Month)</u>	<u>Cost T. L.</u>
- Drivers	2	36 (T.L. 1500 per month)	108 000
- Laboratory Technicians	3	36 (T.L. 1000 " ")	108 000
- Assistant Workers	3	36 (T.L. 750 " ")	81 000
- Travel Expenses			75 000
<u>Operating Expenses</u>			
- Material			15 000
- Agricultural Equipment, seed, fertilizer, farm, supplies, etc.			90 000
- Operating, maintenance and repair of vehicles, equipment and machinery			300 000
- Equipment for the survey work and tests in the field			80 000
- Operating, maintenance and repair of buildings			300 000
- Supplies and stationery for offices and laboratories			120 000
- Custom's inspection, transportation, insurance, handling and storage expenses for project equipment			50 000
- Operating and maintenance of the cold storage			75 000
- Management and maintenance of greenhouses			100 000
- Equipment, tools and supplies to be used in laboratories in the seed cleaning storehouse, greenhouses seed preserving, cold store houses			250 000
			1 380 000
<u>Miscellaneous</u>			
- P.T.T. expenditures			90 000
- Unexpected expenses			225 000
- Travel expenses of foreign people within the country			33 000
			348 000

Appendix 1ITINERARY
(8 to 23 December 1970)December

- 8 Arrival in Ankara.
- 9 Conference with Mr. George Hutton SAA/FAO Representative and
Sixten Heppling UNDP Resident Representative.
- 10 Interviews with Ekrem Günay, Ministry of Agriculture, Mustafa Akpin,
Foreign Office, and Akşit Kayalar, State Planning Organization.
Visits with Osman Tosun, College of Agriculture and Dr. Wright,
Rockefeller Foundation.
- 11-17 Izmir. Visits to the Regional Agricultural Research Centre, Ege
University and surrounding areas, conference with Professor Dr.
Vamık Tayşi, Dr. Halidun Eresen, Dr. Basri Devecioğlu, Aysel Manas,
Kaya Alman, Nedret Settar, Ebbe Kjellqvist (FAO), and others.
- 18 Ankara. Oral report given to Ekrem Günay, Akşit Kayalar, George
Hutton and others; additional conferences with Messrs. Hutton and
Heppling.
- 19-21 Rome. Oral report to FAO personnel.
- 22 Harlan to New York.
- 23 Oral report to Björn Johannesson, UNDP.

SITE CARD

Appendix 2

Site Identification :

Observer : Date : Site No. km.:

Elevation : Aspect : Lat : Long :

Vegetation / Association Type :

Disturbance Factors :

Soil : Light, heavy/calcareous, acidic, saline/deep, shallow/grey, brown, red/stony

Other information :

Collection :

Species Name	Accession No.	No.	H S V	Associated Species Cultivated
		1		
		2		
		3		
		4		
		5		
		6		
		7		
		8		
		9		
		10		Wild
		11		
		12		
		13		
		14		
		15		
		16		
		17		
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Appendix 3

ACCEPTANCE OF CONDITIONS FOR OBTAINING GERM PLASM FROM THE
AGRICULTURAL RESEARCH AND INTRODUCTION CENTRE,
IZMIR, TURKEY

Name of Research Station or
University requesting material : _____

Name of Station Director or
University Departmental Head : _____

Name of person or persons
responsible for undertaking
work on germ plasm material : _____

I have read the conditions concerning germ plasm material obtained from the Izmir Agricultural Research and Introduction Centre. I agree to follow these conditions as set out below :

1. To immediately reconstitute the germ plasm material and then preserve not less than 50 per cent of this material in good storage conditions, this to be available, on request, to bona fide and responsible plant breeders, the Izmir Centre and FAO.
2. The Izmir Centre can request, free of charge :
 - a. Not more than 30 per cent of the reconstituted seed.
 - b. Any varieties developed from the original germ plasm material obtained from the Izmir Centre.
3. Any new varieties (2 a. above) can be propagated in Turkey without any restriction, whatever may be the Patent or other regulations of the country to which material has been sent.
4. To supply the results of work done on germ plasm material to the Izmir Centre when these results are available.

On behalf of _____ (1) I hereby agree as, Director/Department Head (2) of this Institution to follow the conditions stated above and also agree to ensure that these conditions are followed by persons working under my direction on germ plasm material obtained from the Izmir Centre.

Signature (3) _____

Date : _____

- (1) Name of Research station or
University Department
- (2) Cross out whichever is not
applicable
- (3) Signature of Director
or University Head of
Department.

UNITED NATIONS SPECIAL FUND
CROP RESEARCH AND INTRODUCTION CENTRE
WITH THE GOVERNMENT OF TURKEY
MINISTRY OF AGRICULTURE



Executing Agency
FOOD AND AGRICULTURE ORGANIZATION
OF THE UNITED NATIONS

BİRLEŞMİŞ MİLLETLER ÖZEL FONU VE
TÜRKİYE CUMHURİYETİ TARIM BAKANLIĞI
ZİRAAT ARAŞTIRMA VE İNTRODÜKSİYON
MERKEZİ

İcra Organı
BİRLEŞMİŞ MİLLETLER
GIDA VE TARIM TEŞKİLATI

P. O. Box 4 / İZMİR — Karşıyaka Cable / Telgraf : FODAGRI — İZMİR — Karşıyaka Telephone / Telefon : 17 454

PROCEDURE FOR OBTAINING SAMPLES OF PLANT GERM PLASM FROM THE AGRICULTURAL
RESEARCH AND INTRODUCTION CENTRE IN İZMİR, TURKEY. **

TO WHOM IT MAY CONCERN :

One of the basic aims of the Agr. Research and Introduction Centre in İzmir is to collect plant germ plasm in Turkey and other Middle East countries. The germ plasm resources deposited in the İzmir Centre should be utilized in one or more of the following ways :

1. By Turkish plant breeders for immediate crop improvement.
2. Be preserved for future use by Turkish and foreign plant breeders.
3. Be made available to foreign plant breeders and/or research students for utilization in their research programmes elsewhere in the world.

The size of the germ plasm samples deposited in İzmir Centre is, in most cases, very small and limited as compared to the demands for these. Therefore, these resources must be utilized in the most economical way to assure both their continued availability to all interested in them and also to permit their preservation for future use.

It is also very important to note here that the İzmir Centre aims at being not only a bank for germ plasm resources originating in the Middle East but also aims to serve as an information center on the value of the collections deposited in its bank. Needless to say, such information can only be obtained through the students (both domestic and foreign) of these resources.

To achieve the above mentioned aims, which are very ambitious, the İzmir Centre has formulated certain conditions under which it will distribute sub-samples of its germ plasm resources. Before despatch of material, the recipient must agree to these conditions which are as follows :

1. The first step after receiving any germ plasm material will be its reconstitution leading to an increase in the amount of either seeds or vegetative material.
2. During the process of reconstitution of the samples, all possible measures will be taken to limit gene erosion.
3. A certain amount of the seeds obtained from the first reconstitution, not less than 30 per cent, will be preserved under the best storage conditions available. Such seeds will be available for distribution to domestic as well as foreign plant breeders. Requests for these seeds may come directly from the breeders, through the İzmir Centre or through FAO.
4. In some instances the İzmir Centre may request free of any charges, a certain amount of the seeds (not more than 30 per cent) obtained from the first reconstitution.
5. Assurances must be given that the İzmir Centre, upon request, will receive sufficient samples free of any charges, of any new variety in the development of which germ plasm resources from the İzmir Centre have been used.

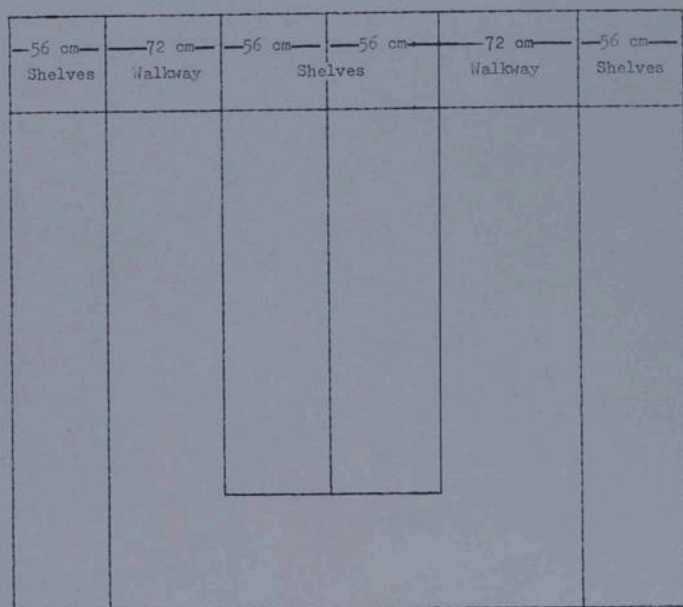
Assurances must also be given that, if so desired such varieties can be propagated in Turkey without any restrictions, even if these varieties are elsewhere subject to plant patents, or any other propagation restrictions.

6. Any important information resulting from the studies of the germ plasm obtained from İzmir Centre will be sent to the Centre as soon as this is available.

** It is expected that preservation and utilization of germ plasm resources will in the near future, be coordinated by FAO at a world level. By that time the present regulations might be modified to conform with international regulations.

Appendix 4

PROPOSED PLAN FOR SHELF ARRANGEMENT IN TYPICAL COLD STORAGE ROOM



PROJECT REQUEST TO THE GOVERNMENT OF SWEDEN
THROUGH EAC

I. TITLE

Exploration and conservation of plant germplasm in the
Near East

SYMBOL

7/SIDA/35

RECIPIENT COUNTRIES

Turkey, Syria, Iraq, Iran, Afghanistan and Pakistan

NATIONAL MINISTRIES INVOLVED

Ministries of Agriculture

DONOR CONTRIBUTION

US \$1,336,000

DURATION

Five years

II. BACKGROUND

The Problem

The green revolution, while increasing grain harvests considerably in many regions over the past few years, has at the same time brought about a realization among plant breeders that they are rapidly losing the major source of raw materials on which all further work depends. The solution to this problem lies in setting up plant exploration programmes in areas of maximum diversity of our major crop plants and establishing long-term storage facilities for their maintenance.

A project of this nature was established at Izmir, Turkey, between 1964-1969 under a UNDP/SF/PAC project (TUR/8) and has since then continued with further UNDP and Turkish Government support.

At present most gene banks are situated outside the gene centres, which brings certain disadvantages. Regional organizations within the gene centres would permit - as experience at Izmir has shown - coordinated exploration activities from year to year in a way that single expeditions from other countries would find impossible. Furthermore, trained local personnel would be able to penetrate to the more remote areas and form permanent contacts with farmers and peasants much more easily than it is possible for scientists from other countries. Additionally, the benefits to the developing countries from participating in an organized, coordinated effort would be substantial. Local personnel, trained and utilized in collection and preservation activities in their own countries, would contribute significantly to the screening and utilization of their local material in national plant breeding programmes. (Further information is given in Appendix I.)

Related Projects

The project is of direct relevance to national crop improvement programmes as well as other research programmes, presently being carried out in the member countries in the following ways:

- (1) By organizing collection and conservation of the native plant germplasm and making it available whenever requested;
- (2) By organizing introduction of plant germplasm collections from other parts of the world as well as improved varieties;
- (3) By stimulating regional cooperation between member countries, particularly for the evaluation and utilization of plant germplasm collections which is of direct relevance to the development programmes of the countries involved.

Prospects for a truly international effort could be greatly enhanced by international cooperation in establishing the proposed project. The development of the Izmir Centre as a regional facility, serving all or part of three of the eight gene centres delineated by the Russian scientist Vavilov would be a major step towards a global concept. This region is one of the most utilized genetic resources areas in the world, and all efforts would be coordinated towards making extensive and valuable collections. Furthermore, a pattern of regional and inter-regional cooperation would have been established.

Governments' Interests and Support

See Annex I, II, III, IV, V and VI.

Documentation

Report by Drs. Barlan and Janco, December 1970, ASP:58/TU/S
Mission Report US/B4493.

III. Purpose

It is the purpose of the present request to extend the scope of the Turkish UEDP/PAC project to countries in the Middle East in view of the serious threat to genetic resources in the whole region of almost all cultivated crops.

It is proposed that a regional germplasm collection and preservation programme should be carried out in the following countries: Turkey, Syria, Iraq, Iran, Afghanistan and Pakistan with the Agricultural Research and Introduction Centre at Izmir, Turkey, as the central location of the project.

These countries comprise all or part of three of the eight gene centres described by N.I. Vavilov, the Russian scientist, who half a century ago conducted a world survey and study of our most important crops.

Although an international association may ultimately develop, the importance of a regional association of countries at the present time cannot be too highly stressed. It is neither necessary nor economic to establish permanent gene banks for long-term storage in every country. The feasible solution is to establish regional gene banks to serve a group of countries with similar ecological characteristics. Regional collection and preservation activities, as well as periodical multiplication and rejuvenation of collections must be coordinated.

Working collections will be maintained as required in the countries concerned and a complete set of all collections will be maintained under long-term storage at Izmir, Turkey, where the necessary facilities are already available. Also the documentation

centre will be maintained at Izmir, with a computer-based information storage and retrieval system.

Local personnel will receive initial field training in Turkey, followed by a period of one year at University of Birmingham, U.K., where they will study for the M.Sc. degree in "Conservation and Utilization of Plant Genetic Resources".

The project aims:

- (i) To carry out a systematic regional plant exploration programme in Turkey, Syria, Iraq, Iran, Afghanistan and Pakistan on a cooperative basis.
- (ii) To provide safe long-term storage of seed and other materials in order to preserve the genetic resources of the countries mentioned, both for their own use and that of the rest of the world in plant breeding.
- (iii) To provide a documentation centre at Izmir.
- (iv) To provide facilities for short-term storage of working collections and introductions to the member countries.
- (v) To provide a framework for regional cooperation in the evaluation and utilization of the germplasm material so collected.

Design

(i) Exploration

Beginning in 1974, for a period of five years, field exploration and collection activities would be organized in each of the member countries. The annual field exploration activities would be planned and executed with the assistance of the project coordinator.

Collections would be made on an area basis and along ecological principles, though on an agreed priority basis.

(ii) Maintenance

The collected material would be processed and all or part forwarded along with collection records and herbarium specimens to the Ixmiquilpan Centre for long-term storage, final identification and documentation. The participating countries would each establish a small germplasm unit, preferably in the agency responsible for plant introduction.

(iii) Distribution

The combined seed collections would be available to all member countries and the international community on request.

Subsamples of seed collections would be prepared at Ixmiquilpan for safe keeping in other gene banks. Simultaneously, the Ixmiquilpan Centre would be recipient of subsamples from other regional centres.

(iv) Rejuvenation

For ecological and genetical reasons, it is essential that rejuvenation of seedstock be done on a regional basis. In order to maintain variability or prevent genetic change by selection in an environment to which the original samples were not adapted, they must be rejuvenated (i.e. grown again from seed) in the countries where they were collected and in an environment as close as possible to their original habitats.

(v) Evaluation

It is also desirable that evaluation programmes be carried out on a regional basis so that the genetic potential of the material can be studied satisfactorily under as widely varied environments as

possible. The project would provide a framework for just such regional approach.

(vi) Training of Personnel

Participating countries except Turkey would provide two professionals each, who would receive training in exploration, processing and documentation techniques at Izmir for a six weeks' period. They would then proceed to Birmingham, U.K., for the one year's M.Sc. course in "Conservation and Utilization of Plant Genetic Resources". Five fellows (one from each member country) would be sent in 1973-1974, and a further five in 1974-1975.

Time Schedule of project operations

1973 - In order to start collection activities in Syria, Iraq, Iran, Afghanistan and Pakistan, under the leadership of competent domestic professions as soon as possible, it is essential that practical and theoretical training be provided for people, one from each country, already in 1973. This, however, would require fellowships to be available as a pre-project activity already from 1 August 1973.

The Izmir Centre is prepared and ready to provide a practical training course in "Exploration, Conservation and Documentation of Plant Genetic Resources", for such trainees during six weeks, starting 1 August. Furthermore, Prof. J.G. Hawkes at the Botany Department of the Birmingham University, Birmingham, U.K., is ready to accept qualified candidates for the M.Sc. course in "Conservation and Utilization of Plant Genetic Resources".

1974 - February: First Board meeting to be held at Izmir for approximately one week. The programme of the meeting will be:

- (a) To discuss the different project activities and their implementation in a coordinated effort;
- (b) To establish the priorities for field and other project operations;
- (c) To identify the immediate action required both by the Board members and the Project Coordinator.

- Spring: Survey existing collections in respective countries to get an up-to-date picture of the present situation.

- Summer: Start field operations in respective country. This is likely to be confined to market surveys and market samplings.

Field course in Turkey for the second lot of trainees.

- Autumn: Second Board meeting; the programme of which will be:

- (a) to review the achievements so far;
- (b) to discuss problems encountered during the operations;
- (c) to formulate the next action programme.

1976 - In consecutive years only one Board meeting is foreseen, the purpose of which will be:

- (a) to review achievements;
- (b) to decide about the new action programme.

VI. (A) HOME PLAN

Location and Phasing of the Project

The Centre of the project will be in Izmir, Turkey and it will include Syria, Iraq, Iran, Afghanistan and Pakistan. In each of these countries will be established a national unit which will function in cooperation with the Centre. The phasing of the project will be from 1 January 1974 until 1 January 1979.

(B) SUPPORTING MATERIAL TO THE WORK PLAN

1. The official to be responsible

Project Coordinator in cooperation with the Managing Board of the project.

2. The nature of personnel, supplies, equipment, fellowships, etc. to be provided

The Project Coordinator and the Assistant Project Coordinator are provided by the Donor^{1/}. The Project Coordinator will be responsible: (1) for the coordination of the programmes between the Centre and the units in other member countries; (2) he will be actively involved in the technical and scientific matters of the project.

The Assistant Project Coordinator will be assisting the Project Coordinator in all respects.

The Managing Board is formed by two representatives from each member country. They will be responsible for the execution of their country programmes.

The project would be assisted by an International Scientific Advisory Council which will consist of seven specialists whose fields would be of direct relevance to the major activities of the project.

The members of the Advisory Council would be called upon whenever needed.

The central gene bank would require moisture-proof seed containers and packages; in addition, electricity consumption of the bank would need to be covered. For the central documentation system

^{1/} They must be technically competent and their duty station will be at the Centre.

punch cards and computer time is required to enable electronic data processing. Central herbarium will require additional cabinets, etc. in due time. A field vehicle and some laboratory equipment is also required.

For field operations, one set of field and laboratory equipment (i.e. carry-all vehicle, seed cleaner, seed thresher, dehuldfier, seed-moist tester, seed packages, collecting equipment) for each unit in Syria, Iraq, Iran, Afghanistan and Pakistan are foreseen from the beginning of the project. In addition, operation expenditures (shipment of collections, mail, fuel, etc.) are required.

Ten fellowships, each of 18 months duration for the training of the professionals are required for Syria, Iraq, Iran, Afghanistan and Pakistan (two each). Each candidate will receive practical training in Turkey and then attend the one year M.Sc. course in "Conservation and Utilization of Plant Genetic Resources" at Birmingham University, U.K. Turkey would require 18 months of fellowships to enable further training of existing professionals.

The Managing Board, which ought to consist of one administrator and one technical staff member from each member country, will meet once a year, in 1974 twice, to discuss the work programmes. Their venue will rotate among member countries. The costs of these symposia (travel and allowances) is foreseen to be covered by the project.

The professionals involved in the project should be given the opportunity to attend technical conferences abroad. For this reason, an allocation has been made in the budget.

3. The Potential Role of Volunteers and/or Associate Experts

The project would greatly benefit from the services of associate experts in the following fields:

- (i) Documentation (computer science specialist);
- (ii) Conservation, to deal with special problems;
- (iii) Tree fruit exploration and conservation;
- (iv) Plant quarantine.

Their duty station would be Izmir.

4. The Nature of Counterpart Contribution

(a) Personnel

Centre: 1 Director

7 Professionals: 1 Taxonomist
 1 Seed Physiologist
 1 Documentation Specialist
 1 Tissue-culture Specialist
 1 Tree-fruit Specialist
 1 Rejuvenation Specialist
 1 Quarantine Officer

1 Clerk

1 Bilingual Secretary

10 Technicians

2 Drivers

2 Messengers

Syrian, Iraqi, Iranian, Afghani and Pakistani units:

2 Professionals

1 Bilingual Secretary

2 Technicians

1 Driver

Staff hire, supplementary salaries and per diems for the local personnel involved in the project are requested out of the project funds; since their services are, on the whole, for the international community and not restricted to the interests and benefits of their own countries.

(b) Buildings

Approximately 600 m² of buildings, comprising four units:

- a. a threshing, cleaning room;
- b. a seed preparation room;
- c. a short-term seed storage room for working stocks;
- d. offices, etc.

The seed preparation room must be air-tight and equipped with a dehumidifier, which will be provided by the Donor. Otherwise, no special structural requirements are necessary.

(c) Equipment (each country)

Normal office and laboratory furniture will be supplied by member countries.

5. Preliminary Mission

One fellowship for Syria, Iraq, Iran, Afghanistan and Pakistan respectively is requested as of 1 August 1975 in order to make it possible for the candidates to receive practical training in plant exploration and other gene bank activities in Turkey before they would attend the one year's M.Sc. course at Birmingham. This is most important in order to get trained personnel engaged in the project as soon as possible. Upon return to their respective home countries, the candidates ought to have a short debriefing at the Ismir Centre.

Follow-up

It is difficult to predict the capacity of the project to carry on these activities after termination of outside assistance or what alternative sources of support may materialize in the interval. However, there are strong economic reasons for the developed countries, who are so dependent on the genetic resources in this area, to continue to assist in financing their preservation through some medium. It is also very probable that as expertise is developed in the project area, the level of external support required, may diminish. Additionally, there are increasing indications that major users of these genetic resources are moving toward a joint effort in collection and preservation activities, which preferably should be done under the catalytic auspices of an international organization. Meanwhile, a leader pilot project can be successfully undertaken at very modest cost with very substantial benefits in (1) the preservation of irreplaceable genetic resources; (2) establishing a pattern for international and regional cooperation in an activity of growing importance to mankind; (3) the evaluation and utilization of plant germplasm material on a regional basis. The last point being of extreme importance should be strongly supported and constitutes a natural follow-up of the present project.

V. ESTIMATED COSTS

		A. Donor Contribution in US \$					
1. Project Code	Man/Months	1974	1975	1976	1977	1978	TOTAL
<u>Code 10</u>							
1. Project Coord. (1-5)	60	32,000	32,000	32,000	32,000	32,000	160,000
2. Assist. Project Coord. (1-4)	60	23,000	23,000	23,000	23,000	23,000	140,000
3. Consultants	16	3,000	11,000	2,000	7,000	5,000	40,000
Sub-total		68,000	71,000	69,000	67,000	65,000	540,000
<u>Code 20</u>							
1. Annual Symposia expenses 2 persons/country/year		10,000	5,500	6,000	6,500	6,000	54,000
2. Attendance at technical conferences		5,000	5,000	5,000	5,500	5,000	35,500
3. Official duty travel		7,000	7,000	6,000	6,000	5,000	31,000
Sub-total		32,000	17,500	17,000	18,000	16,000	90,500
<u>Code 30</u>							
1. Local expenditures, staff hire, etc.		71,000	71,000	71,000	71,000	71,000	355,000
Sub-total		71,000	71,000	71,000	71,000	71,000	355,000
<u>Code 40</u>							
1. Rental and maintenance (computer time, repairs, running expenses of seed storage)		7,300	7,300	3,300	5,800	3,500	40,700
2. Shipment of materials and communication		6,000	6,000	6,000	6,000	5,000	39,000
3. Miscellaneous and contingencies		13,000	15,000	14,000	14,000	14,000	69,000
Sub-total		26,300	28,300	23,300	25,800	22,500	127,700

	Jan/ months	1974	1975	1976	1977	1978	TOTAL
<u>Code 50</u>							
1. Good storage suppl.		6,000	9,000	11,000	5,000	4,000	35,000
2. Documentation suppl.		3,000	4,000	4,000	2,000	2,000	15,000
3. Printing		4,000	4,000	4,000	4,000	3,000	19,000
4. Fuel supply		3,000	3,000	3,000	3,000	2,500	14,500
Sub-total		16,000	20,000	22,000	14,000	11,500	83,500
<u>Code 60</u>							
1. Herbarium equipment		3,000	3,500	4,000	4,500	4,500	19,500
2. Purchase of publications		4,000	4,000	4,000	4,000	3,000	19,000
3. 6 carry-all vehicles (purchase, transport, insurance)		42,000	-	-	-	-	42,000
4. Field and laboratory equipment		42,000	-	-	-	-	42,000
Sub-total		91,000	7,500	8,000	8,500	7,500	122,500
<u>Code 70</u>		-	-	-	-	-	-
<u>Code 80</u>							
Fellowships	168	38,750	48,050	-	-	-	86,800
Sub-total		38,750	48,050	-	-	-	86,800
<u>Code 90</u>		46,530	36,560	30,140	29,080	27,000	170,310
Total		370,570	298,610	345,440	336,520	226,500	1,586,240

V. ESTIMATED COSTSB. Counterpart Contribution1. Turkey

	<u>TL.</u>	<u>US \$</u>
(i) Personnel		
Professionals (3)	350,000	35,000
Technicians (2)	175,000	17,500
Secretary (1)	87,500	8,750
Driver (1)	87,500	8,750
(ii) Equipment and supplies	4,900,000	305,000
(iii) Buildings and land	30,000,000	2,142,850

2. Syria

	<u>Syrian pound</u>	<u>US \$</u>
(i) Personnel		
Professionals (3)	60,000	30,000
Technicians (2)	40,000	10,000
Secretary (1)	15,000	3,750
Drivers (1)	15,000	3,750
(ii) Equipment and supplies	5,000	1,250
(iii) Buildings and land	available	

3. Iraq

	<u>I.R.</u>	<u>US \$</u>
(i) Personnel		
Professionals (3)	10,000	35,000
Technicians (2)	4,000	15,300
Secretary (1)	3,000	9,900
Driver (1)	1,250	4,135
(ii) Equipment and supplies	750	2,475
(iii) Buildings and land	available	

4.	<u>Iran</u>	<u>Iran</u>	<u>US \$</u>
(1)	Personnel		
	Professionals (2)	2,000,000	27,000
	Technicians (3)	1,500,000	20,000
	Secretary (1)	750,000	10,000
	Driver (1)	750,000	10,000
(ii)	Equipment and supplies	150,000	2,000
(iii)	Buildings and land	available	

5.	<u>Afghanistan</u>	<u>Afn.</u>	<u>US \$</u>
(1)	Personnel		
	Professionals (2)	500,000	7,500
	Technicians (2)	250,000	3,750
	Secretary (1)	300,000	4,500
	Driver (1)	150,000	2,250
(ii)	Equipment and supplies	60,000	900
(iii)	Buildings and land	available	

6.	<u>Pakistan</u>	<u>Rupia</u>	<u>US \$</u>
(1)	Personnel		
	Professionals (2)	150,000	15,000
	Technicians (2)	90,000	9,000
	Secretary (1)	30,000	3,000
	Driver (1)	18,000	1,800
(ii)	Equipment and supplies	20,000	2,000
(iii)	Buildings and land	available	

BACKGROUND

The domestication of plants and animals has been a revolution in the life span of humanity. Human beings depend upon plants, directly or indirectly for obtaining most of their needs.

Parallel to the increase in human population on the earth, the demand for plant sources has increased. As a natural result of this, humanity faces, among others, hunger problems which are becoming more and more serious. To overcome this immense problem, the scientists have rightly aimed at increased yield per unit area. The best result for this purpose has been obtained through breeding new varieties of cultivated crops. The application of improved crop varieties, however, is causing extinction of old primitive cultivars and their wild relatives, which are on the other hand, the best sources of variation and on which plant breeding highly depends.

The Russian scientists N.I. Vavilov and his colleagues have been collecting cultivated plants from all over the world during the 1930s. Their studies on the collected material revealed the existence of eight Centres of Origin or Centres of Genetic Diversity on the earth. These Centres were referred to as Gene Centres later on. These Centres are as follows:

- | | |
|------|----------------------------|
| I. | The Chinese Centre |
| II. | The Indian Centre |
| IIa | The Indo-Malayan Centre |
| III. | The Central Asiatic Centre |
| IV. | The Near Eastern Centre |
| V. | The Mediterranean Centre |
| VI. | The Abyssinian Centre |

- VII. The South Mexico and Central American Centre
- VIII. South American (Peruvian-Bolivian) Centre
- VIIIa The Chile Centre
- VIIIb The Brazilian-Paraguayan Centre

Rapid development of plant breeding techniques and utilization of genetic material originating in these regions of the world, has increased mankind's dependence on preservation of these genetic resources, which, today, are in danger of extinction; (i) because of human and animal pressures, and (ii) in no small measure from man's success in displacing local cultivars characterized by a very wide genetic variation, with modern high-yielding varieties, with a very narrow genetic base. Theoretically, if man succeeded in substituting the narrow based uniform varieties, the so-called improved varieties, for the so-called primitive cultivars, he would be in danger of imminent disaster, because he would have succeeded in destroying the heterogeneous material from which he derives the needed genes to counteract the inevitable evolution taking place in plant diseases and pests. Prof. Harlan has recently and correctly said: "to waste and squander our genetic resources of crop plants might be as dangerous as atomic warfare".

The more advanced stages of plant breeding are most dependent on a wide range of genetic resources because of the specific character of the requirements of the breeding programmes. Furthermore, those countries of the world with the most advanced plant breeding programmes are located outside of the gene centres and the great bulk of their economically important plants are introductions, which must be sustained through plant breeding programmes, dependent upon material only available from these gene centres.

Following are some examples illustrating the importance of local cultivars and their wild relatives, originating from Turkey, for crop improvement programmes:

- Septoria has become a serious problem for Mexican wheat varieties when they were grown in Turkey. Strains of bread wheat, resistant to Septoria have been found among local cultivar collections from Turkey and is being incorporated in the Mexican wheat varieties.
 - In a study where USDA World Durum Collection has been screened for stem rust (Puccinia graminis tritici) resistance, it was found that most of the varieties resistant to four races of the pathogen came from southern Turkey.
 - Similarly, USDA World Aestivum Collection has been screened for snow-mould resistance and the only resistant varieties were found to have originated from a small plain in South-East Turkey and in an isolated valley in Eastern Turkey.
 - Dr. L. Johnson (U.S.A.) has found strains of Triticum monoccoccum with high protein content originating from Turkey. This discovery might open a gate for increasing protein content in hard and bread wheats.
 - Resistance to barley leaf beetle has been reported in hairy forms of Hordeum spontaneum originating from Turkey.
 - Characters like non-shattering pod, subterranean pod formation, soft seed coat found in some of the common vetches originating from Turkey, are very valuable for breeding purposes.
- Many more examples of this type could be quoted.

Until fairly recent times, germplasm collection and preservation activities have been confined at best to national efforts, largely concentrated in the so-called developed countries with advanced plant breeding programmes. These activities were primarily undertaken to collect material to be used in solving current breeding problems. In many cases, the material was screened and when the problem was solved, the collected material was destroyed. There was a tendency to consider the gene centres as permanent gene banks. In recent years, plant breeders, economic botanists, etc. have become alarmed by the depletion of the "natural" gene banks. As a result, national and regional efforts to establish permanent gene banks which could preserve these genetic resources for posterity have been undertaken. However, to date, with no exception, the gene bank in India, the established gene banks are outside the gene centres, and collection and preservation activities of germplasm material within the gene centres are highly fragmented and uncoordinated. Furthermore, such fragmented and uncoordinated efforts yield very limited results considering the cumulative costs to the participants. If these expenditures were channelled through a coordinated global effort utilizing local personnel, far greater achievements would be realized. Additionally, the benefits to the developing countries from participating in an organized coordinated effort would be substantial. Local personnel, trained and utilized in collection and preservation activities in their own country would contribute significantly to the utilization of this native material in economic, national plant breeding programmes. Ideally existing regional and national institutions concerned with the preservation and utilization

(7)

of the plant genetic resources should be organized in an international association in order to provide a framework within which their individual efforts can be coordinated and new initiatives taken on a priority basis.

Within this global framework regional cooperation is of great importance. It is neither necessary nor economic to establish permanent gene banks for long-term storage in every country. The feasible solution is to establish such gene banks to serve regions on a geographic basis. These require coordinated regional collection and preservation activities. This is particularly so in the case of multiplication and rejuvenation of collections. If local personnel are to participate in these activities which are concentrated in the developing countries, regional projects facilitate training and guidance. Experience has proven that local personnel with training and guidance are far superior collectors in their own countries than expatriates with limited knowledge of the working environment.

National and international concern about the loss of the genetic resources of crop plants in the Middle East resulted in the establishment of an Introduction Centre at Izmir in 1964, under a UNDP/SP/PAC project (TUR/8). This project terminates definitely on 31 December 1973.

Agricultural Research and
Introduction Centre
P. O. Box 9, Menemen
Izmir, Turkey

16 May 1973
TUR/8-293

Dear Dave,

I am back again in Izmir, after a rather hectic trip to Sweden and Rome. I had some very good discussions with SIDA authorities in Stockholm, why I have reasons to look rather optimistic to the future.

While I was in Rome, I got the machinery started for you to come to Izmir as consultant between 15 June-15 July. Jorge Leon was delighted that you would be able to come for a month.

On Saturday, I am leaving for a Wheat Seminar in Teheran. However, the prime purpose for my, as well as Jorge's participation, is to try to cook something with Pakistanis in the field of collection and conservation in Pakistan, spending some of your P.L. 480 funds. We plan to return together to Ankara on Wednesday, 23rd May.

As to your forthcoming duties here in Izmir, I can quite easily present you our needs. We have a considerable amount of habitat data. I believe Ayla sent you a format for habitat descriptors. However, since habitat data were not recorded in the same way as done during the last couple of years, we have the problem with their transfer. Can they be stored as they stand and by means of a small programme be arranged so as to conform with the data of the last couple of years, or do we have to manipulate the data before computerisation?

Another problem exists concerning storage data. When I say storage data, I talk about cold storage. Then we have morphological data to handle or, for instance, Cicer, Secale and various forage species. What Ayla has worked out in this regard on Secale, I want you to have a close look at. Furthermore, we will have cytological data, physiological data and genetical data, in need of processing. All of them do represent problems, which I hope you can help us out with.

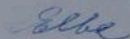
./...

Furthermore, it is not only handling and processing such data, but may be above all, evaluation of these. For instance, how can we produce distribution maps, find out taxonomic affinities between taxa, evolutionary relationships, etc.?

Finally, on basis of the amount of data to be processed and handled, I hope you could help me with an estimate of soft and hardware requirements.

Well Dave, I hope what I just have said is enough for you to have got a picture of our needs. I am doubtful though that a month will be sufficient time to solve them all. There is, at least, no doubt in my mind that we will keep you more than busy, although we will still find time to get to a beach once in a while.

Sincerely,



Dr. EBBE KJELLQVIST
Project Liaison Officer

Prof. D. Rogers
Taximetrics Lab.
Dept. EPO Biology
University of Colorado
Boulder, Colorado 80302
U.S.A.

EK/ct

May 9, 1973

Dear Ayha:

Please forgive me if I have mis-spelled your name--I have no skills in such things.

Your data have arrived, and Gil and I have looked them over rather hurriedly, so there are no very good remarks that I can make about them. However, since it seems that I will be visiting you in Izmir next month, we can probably do much better after I arrive there.

Ebbe has written that he expects me about June 15. I had asked him to give me a list of instructions of the work needed to be done. Unfortunately, in his last letter, he did not have time to tell me anything specific. Do you know approximately what he had in mind for the Documentation consultant to do? Any information you wish to give me will be much appreciated.

The only publication about TAXIR that would be useful to you needs considerable improvement before I send it to you. However, from your standpoint, I think you have a good grasp of the proper construction of descriptors and descriptor states. Your data formats seem well thought out, and can be used in TAXIR with very little change. The things that I need to tell you can, therefore, wait until I arrive. I suggest you go ahead and use the present formats, because you will not have much modification to do, once we get TAXIR going over there. Some actual experience using the format as a guide in data gathering will probably give you some ideas as to better construction of the format. Again, when I see you, we can cover all the details.

Sincerely,

David J. Rogers
Professor of Biology

Miss H. A. Sencer
Agricultural Research and Introduction Centre
P. O. Box 9, Menemen
Izmir, Turkey

Agricultural Research and
Introduction Centre
P. O. Box 9, Menemen
Izmir, Turkey

3 May 1973
TUR/8-287

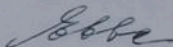
Dear Dave,

Thank you very much for your letter of April 26, 1973,
which arrived this morning.

As I am leaving tomorrow morning for Sweden (SIDA) to
be followed by a visit to FAO, I have really no time to reply
to your letter properly until after I am back, which will be
on Saturday, May 12, 1973.

At the moment I only want to express my satisfaction that
you will be able to come here for a month around 15 June-
15 July. The time is all right with me, Nedret and Ayla.
When I get to FAO next week I will get the machinery in motion
for your consultancy.

Yours sincerely,



Dr. EBBE KJELLQVIST
Project Liaison Officer

Prof. D. J. Rogers
Taximetric Lab.
Dept. EPO Biology
University of Colorado
Boulder, Colorado 80302
U.S.A.

EK/ct

Agricultural Research and
Introduction Centre
P. O. Box 9, Menemen
Izmir, Turkey

12 April 1973
TUR/8-252

Dear Dave,

It was indeed very nice to see you again in Rome. It was only a pity that we were too busy to have more time together.

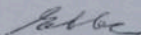
You might be interested to know that I stayed on another week, during which I re-drafted the regional proposal for submission to SIDA. Talking to Jorge on the phone, a couple of days ago, I understood that the proposal has been officially submitted to SIDA. Furthermore, I have received a copy of Julien's report and recommendation to SIDA. I also persuaded the UNDP Resident Representative in Ankara to pay a visit to Stockholm to discuss this matter in SIDA, in connection with a duty trip to Europe. This discussion took place last Monday, and hopefully a week from now, I ought to know the prospects.

On assumption that an acceptable solution to the financial problem of the regional project is found, I am writing this letter to you simply to find out if you would be willing to come to Izmir as Consultant on Documentation, for a month in course of this year. We would very much need you here and money is available; why it would depend entirely upon your own desire and time.

It would be useful if you would tell me when you would be able to come and for how long, because depending upon your reply, I will, then, raise the official request accordingly.

With best personal regards,

Sincerely,



Dr. EBBE KJELLQVIST
Project Liaison Officer

Prof. D. J. Rogers
University of Colorado
Department of Biology
Boulder, Colorado 80302

Taximetrics Lab.
Dept. EPO Biology
University of Colorado
Boulder, Colorado 80302
April 26, 1973

Dr. Ebbe Kjellqvist
Agricultural Research and Introduction Centre
P.O. Box 9, Menemen
Izmir, Turkey

Dear Ebbe:

Thank you for your letter of April 12, requesting that I come as a consultant on documentation. I am pleased to have your invitation. Before making a final decision, will you please give me a rather thorough list of duties you want me to perform with respect to documentation? I am sure that you have some very specific ideas, and I want to be sure that I know what these are before final acceptance.

Inasmuch as your Centre is the most critical one in the world, I am anxious to give you the best I can offer, but must insist on some type of instructions. In order to guarantee the best results for your money, we must be certain that the consultant be fully informed about requirements, so that you can make the consultant live up to the requirements.

We want to be certain that what we do fits well with the concept of documentation on a world-wide network. It will be extremely valuable for both your own documentation, and as the first part of the world system.

Looking ahead to available time for the consultancy, I have a very tight schedule to work in, and I wonder if we can make the arrangements sufficiently soon so that I could begin work with you on about the 15th of June. I realize that this may rush your schedule, but I have a very full summer, and must be back here in Boulder by about the 15th of July (or 2 or 3 days thereafter). I have to be here for final planning for an International Congress on Systematic and Evolutionary Biology, which you may have heard about. I am the local chairman for this Congress.

Please let me hear as soon as you can if the time for the consultancy work is all right. Thank you again for the invitation.

Sincerely,

David J. Rogers
Professor of Biology

Agricultural Research and
Introduction Centre
P. O. Box 9, Menemen
Izmir, Turkey

25 April 1973
TUR/8-264

Dear Prof. Rogers,

I was very happy to have had the opportunity of listening to the contributions and seminar given by you and Dr. Hertzsch, in Rome last month. As you will recall, I have had a short discussion with Dr. Hertzsch about my study on the genus Secale L. It has been very useful and I greatly appreciate your kind offer to help me concerning the computerization of the data.

*in
envelope
attached*

As you will find attached, I have tried to develop an "Identification and Location descriptors" form, which is mainly based on "The Standard Collection Record" we use for the documentation of our collections, and a "Morphological Descriptors" form designed specifically for the studies on the genus Secale. Example 1 is a try of transferring data obtained by studying a herbarium specimen, and Example 2 illustrates the transfer of field data about one of our own collections.

I have tried to write the programmes, the way Dr. Hertzsch has suggested in Rome. I am afraid I am not a programmer at all and I could not succeed in getting access to a programmer who could help with this matter. For this reason, I am writing to you at this early stage with the hope to get your opinion and suggestions about the forms and the two examples.

During my endeavours in developing the forms, I have realized how little information I had about TAXIR why I would greatly appreciate if you could kindly make available some publications.

As soon as I hear from you, I will proceed with transfer of the data on to the computer cards and submit them to you for a trial and suggestions.

Very best regards from me and Ebbe,

Yours sincerely,

ASencer

H. A. SENCER (Miss)

P.S. Could you please convey my best regards to Dr. Hersh whose name was misspelled by the secretary, by mistake!