BARD

United States - Israel Binational Agricultural Research and Development Fund

FINAL REPORT

PROJECT No. US-66-79

**Genetic Resources Information System for Israel
and the United States: A Feasibility Study**

J.E. April, M. Zur, G. Hersh, J. Kaltenhauser, I. Baumann

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Date June 21, 1984

P.O.B. 6

Bet Dagan, ISRAEL

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BARD TECHNICAL REPORTS

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Date: June 21, 1984.

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Name of Investigators:

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ABSTRACT

The Plant Introduction Office of the Agriculture Research Organization in Israel and the Laboratory for Information Science in Agriculture (LISA) in the United States joined efforts in performing a feasibility study for a Genetic Resources Information System. Interviews, system analysis, data collection, prototype development and evaluation, advisory committee formation, and user training and orientation methods were employed for conducting the feasibility study. From this study it was determined that an information system capable of storing and retrieving data from many sources would be beneficial. Suggestions and recommendations for design and operation of the system would be provided by 12 Crop Advisory Committees and one Genebank Committee. A User Services group from the Department of Plant Introductions Office at the Volcani Centre would maintain and operate the system. This report, generated from the activities conducted during this research project, describes the feasibility of a genetic resources information system for Israel which is compatible with systems in the United States and other countries.

I. INTRODUCTION

OVERVIEW

Plant genetic resources collections serve as the base material for improvement of cultivated crops. It is usually not known which characteristics in the strains held in a collection will be useful in plant improvement, nor is it known when a given characteristic will be needed. Most characteristics in a collection are not known until they are searched for and described, an expensive task which is not likely to be undertaken in the absence of a purpose or need. And finally, the lines or strains in a collection, since they often have not been named or used, must be identified by such circumstantial information as place of origin, place of collection, observed uses at the point of collection, and so on.

These aspects of genetic resource collections entail some unique management problems. The germplasm material such as seeds must be preserved in a viable state for many years. The characteristics latent in the material must change minimally during storage and re-growing. Because each sample or strain can be regarded as a large pool of unknown characteristics which are progressively revealed during investigation over the years, large amounts of data can be accumulated relating to the collection. Also, the number of strains in a collection is typically very large, on the order of thousands or hundreds of thousands.

The management of collections requires data for guidance and in turn generates data which needs to be preserved. Research on and use of a germplasm collection also generates data which needs to be preserved. In

addition to acquisition and storage of data, data also needs to be disseminated and placed at the disposal of scientists who work with plants. All of this should take place in a framework involving the community which assures that procedures and data adhere to standards which will preserve the usefulness of the plant material and of the associated data for an indefinite length of time. What is needed, in short, is an information system to support the management of the germplasm collection and to support the collection, use, and dissemination of the descriptive and scientific information developed around the germplasm.

The purpose of BARD Research Project US 66-79 entitled "Genetic Resource Information System for Israel and the United States: A Feasibility Study" is to describe the activities and information requirements of germplasm work in Israel in order to assess the feasibility of producing an information system to support these activities and requirements. The information system developed for this purpose in the United States, the Germplasm Resources Information Network, or GRIN, is used as a model and as a complementary resource which, with the proper links, will enhance genetic resources work in both countries. Electronic data processing equipment offers many advantages as a major component in an information system such as that examined in this project, but it is only a component. Even more important than the equipment are the people charged with its management, with the management of the germplasm, and the scientific community which should be the immediate beneficiary, guide, and user of the information system. A significant portion of the study was therefore concerned with the organizational environment of the projected system in Israel.

PROJECT HISTORY

The project ran from 1980 to 1982. Much of the work in the first year was concentrated in investigating germplasm activities in Israel with emphasis on data generation and data processing requirements at various germplasm centers in Israel. A computerized prototype was developed for registering germplasm samples acquired by the Division of Plant Introduction at the Agricultural Research Organization in Bet Dagen.

In the second year a prototype was brought from the United States for demonstration and evaluation. This prototype was for the management and retrieval of information on plant descriptive characteristics. A technician, Sarit Pellech, was trained in the acquisition and preparation of plant descriptive data for use in the prototype. The system was demonstrated to the Israeli Genebank Committee.

An additional amount of operation and evaluation of the prototype system was carried out in the third year. This was done to provide actual working experience for the Plant Introduction Office.

Figure 1 shows the sequence and relationships among activities needed for a full investigation of germplasm activities and for the production of the projected information system. The tasks portrayed in the diagram were not all carried out. Rather the diagram was used as a map and place to put any activities for which there was an expressed desire but no resources to carry them through.

FIGURE 1

YEAR 1

The first year of the project concentrated on developing a research team for the project and collecting information on the current status of germplasm activities in Israel. The project team, which consisted of the Director of the Israeli Plant Introduction Office (PIO), and the Directors and a number of systems analysts from LISA (Information Science specialists developing the U.S. germplasm information system), was expanded to include a data technician hired specifically for the project to assist in research activities for Israel.

The team then conducted a number of interviews with people working in the germplasm field, both public and private, to determine the extent and variety of activities in Israel which are associated with germplasm.

Another activity taking place in year one was the investigation of computing facilities available to the PIO. This included analyzing hardware, software, communication facilities, load capacities and response times.

Exchange visits for training became an important function in the first year. Visits by LISA personnel were used to perform investigations and to become familiar with PIO activities. Visits by Israeli personnel to the U.S. provided a general understanding of information systems especially the one being developed for the United States Department of Agriculture.

After evaluating the status of germplasm in Israel, a prototype development plan was created to test specific functional areas.

YEAR 2

Activities for year two were broken into four functional areas. System Investigation and Development covered the area of software development on the computer system and software recommended in year one. The Data Services area investigated the collection and distribution of data associated with germplasm. Advisory Committees were also included in this area, providing recommendations and guidance in handling the data.

During this year, LISA researchers were in Israel to interview, collect data and develop prototype software for testing. Additional exchange visits by Israeli personnel were used to build knowledge and experience of the continuing development and operation of the U.S. Germplasm Information System and to train on new software and hardware.

YEAR 3

The project was continued for a third year to enable the research team to operate and evaluate the prototype system developed in year two. The core of the system was the user services group which obtained germplasm data according to standards created by the Advisory Committees and distributed that data on request in the form requested by users. At the end of the three year project the system prototype evaluations and user recommendations were used to develop the design and recommendation contained in this report.

II. ISRAELI GERMPLASM ACTIVITIES

ACTIVITIES

A number of personal interviews with members of the Israeli germplasm community were conducted by the research team to determine the status of germplasm activities in Israel. Plans for the continuation of the project were drawn from knowledge gained by these interviews and experience of development of the U.S. system.

A number of the current germplasm research activities are described below. This list is by no means complete, but is presented to give a flavor for the diversity of germplasm activities performed in Israel.

Natural Perserves

There is a large quantity of germplasm material in Israel which has yet to be collected. Much of this material is in danger of being lost due to land development for building and cultivation of crops. Also land varieties (plant material used over many years by some farms) are being replaced by the higher yielding varieties. Both are excellent sources of genetic diversity. Collection and regeneration of material in different environments changes the population characteristic of a sample. When ever possible, natural perserves of material should be established to reduce this change. To encourage continued use of land races, a premium could be established for growing such material. Data collections on these materials should take place in the natural habitat and material collected as needed.

Electrophoresis Analysis

The characteristics displayed by plants vary according to the environment in which the plants are evaluated. The use of electrophoresis to determine amino acid contents of plants could help in determining the relationship between morphology and protein analysis. This could help in making the plant characteristic data more reliable.

Pathogen Susceptibility

Diversity of populations has evolved from selection pressures. Sometimes that selection pressure has been from diseases. Individuals within a population will exhibit different reactions to a specific disease. However, the combined reaction of the population may indicate the likelihood of finding resistance for a specific disease within a specific population. Evaluation of host (pathogen) environment increases the probability of successfully finding resistance to a disease.

Population Preserves

Plant populations are often very diverse. Data collected on a number of individuals does not always represent the population. Therefore general data should only be collected on the populations kept in natural habitats. This general information can then be used to direct collectors to an area so plants with specific characteristics can be observed and collected.

Germplasm Acquisition

Much of the genetic material available in Israel is stored and maintained by individual breeders. Obtaining germplasm from many sources outside the country is a common service performed by the PIO for scientists. Contacts, requests, quarantine and distribution are all provided to assist researchers in utilization of germplasm.

INFORMATION REQUIREMENTS

Most researchers see the need for an organized effort of collection and evaluation of plant materials. The problem in doing so usually lies in reaching agreement on what characteristics will be used for evaluation of the materials. Some researchers think collecting information as well as evaluation for environmental adaptability such as disease and pest resistance is essential. Others argue that evaluation data can be so variable that it is acceptable only when a standard check variety is used for comparison. It can be seen that a comprehensive Genetic Resources Information System must be versatile enough to handle a wide array of data.

The system will also need computing and statistical analysis capabilities powerful enough to generate summary reports on populations from multiple observations, and to convert data into a standard form so that information collected from many sources can be compared. In addition, the statistics capability will allow researchers to analyze the data for testing hypotheses.

The most important feature of the system is data storage and retrieval. Quick, easy and reliable methods for entering data and conducting queries are the most important features of the information system. In testing the prototypes it quickly became clear that data storage and retrieval efficiency would be increased if data standards could be developed and used whenever possible. Creation of data standards is the responsibility of the Crop Advisory Committees established during the project.

The tasks of each committee are broader than just creation of data standards and monitoring data in the information system. Each committee is evaluating the needs of their crop(s) and establishing work priorities for the following areas:

1. Continued Introduction Activities

What materials should be obtained from other countries for use by Israeli scientists?

2. Maintenance

What material should be maintained at the PIO?

3. Wild material

What activities should be explored in wild material preservation (i.e. collection on natural preserves)?

4. Exploration

What areas need to be collected, what materials needed?

5. Research priorities

What research projects and/or evaluations should be undertaken? How can funding be provided?

A list of the 12 crop committee and the committee members' organization and specialty appear in Appendix A.

Overseeing all germplasm activities in Israel is the Genebank committee (Appendix B) The committee has developed recommendations for operation of the genebanks such as formation of the 12 Crop Advisory Committees.

III. UNITED STATES GERMPLASM ACTIVITIES

The Germplasm Resources Information Network (GRIN) is the culmination of several years of co-operative effort between Federal, State, and private sector organizations and individuals to provide a comprehensive and integrated computer assisted information network. GRIN is intended to serve and assist a wide range of plant germplasm users in the acquisition, maintenance, improvement, and distribution of germplasm and information about germplasm. This information network can not only serve as a model for development of an Israeli germplasm information system, but also as a standard to insure compatibility between the United States and Israeli systems.

The information network has been developed as a cooperative project between USDA/ARS and the Laboratory for Information Science in Agriculture (LISA) at Colorado State University. The Germplasm Resources Information Project (GRIP) was initiated in 1977 to develop this information network. Dr. Quentin Jones serves as the coordinator of the project with technical team members from LISA and USDA Communications and Data Services Division (CDSD).

In the implementation, the Regional Plant Introduction Stations will be addressed first, followed by the Small Grains Collection, and the major support sites in the NPGS (The Plant Introduction Office and the National Seed Storage Laboratory). Finally those major curation sites not directly tied to a Regional Station (such as IR-1 and soybeans) will be implemented.

Among the ways the information network will serve the supply community will be by providing tools and mechanisms to register accessions as they enter the NPGS, maintain seed inventories, monitor viability of collections, process seed orders, exchange information with other "suppliers," and generate summary reports. Users with access to a computer terminal with telecommunications capability will be able to receive information on accessions (including characteristic data and location in the system) as well as request samples on a timely basis. Completion of a release at a site means that new terminals and software are in place, the staff has been trained, and appropriate documentation is available. Depending upon resources, additional NPGS sites (such as cotton and the clonal repository system) will be added and system features and capabilities will be enhanced.

GRIN is composed of three major subsystems (Hardware, Software, and Telecommunications), Crop and Operational Advisory Committees, administration --the Database Management Unit (DBMU), various groups or classes of users, and, at the center of the network, data. The information network must perform many functions for a variety of users. Some functions are direct services to researchers or administrators, but many maintain the quality of operating or research data on the system.

HARDWARE

Hardware refers to the physical equipment and devices located both in the CDSD computer center at The National Agricultural Library, Beltsville, MD., and at geographically dispersed end-user sites.

The "heart" or "engine" of the hardware is a Prime 750 super-mini computer installed in the NAL and operated by USDA/CDSD. Connected to the Prime are a variety of devices providing for data storage and retrieval (disk and tape drives), communications to remote sites and other computers, report production (printers), and the operation and maintenance of the Prime.

At the remote USDA sites (Regional Plant Introduction Stations), GRIN has supplied three essential pieces of equipment: A Perkin-Elmer 1251 terminal, Digital Equipment Corporation LA120 printer, and a Dataset (phone/modem) used to connect the terminal and printer to the telecommunications network.

SOFTWARE

There are essentially two types of software in GRIN; (1) General purpose programs, utilities, and procedures which are "native" to the Prime 750 minicomputer in Beltsville or acquired from outside software vendors and (2) those programs, utilities, and procedures constructed by the GRIN team specifically for the NPGS.

The first type includes such things as the PRIMOS operating system, The Database Management System (DBMS), INFO, Vista/Query, text

editors, messaging/mail, and "off-the-shelf" software such as data analysis packages.

The second type (GRIN software) includes order processing, inventory maintenance, co-operator data maintenance, characteristic data maintenance, access to public data, various report generating utilities, and standard GRIN abbreviations and procedures.

TELECOMMUNICATIONS

In order for the remote sites to communicate with the Prime 750 in Beltsville, some telecommunications facility must be utilized. GRIN has chosen to use a commercial service (TELENET) to accomplish this communication. Although there are other methods of communication available, Telenet is the method that will be used most often.

CROP AND OPERATIONAL ADVISORY COMMITTEES

Advisory committees are part of a concept initiated through GRIP to represent the germplasm user community and provide guidance and coordination to the National Plant Germplasm System. Although some have been convened by GRIP, each has assumed responsibility for developing its work program and becoming a self-sustaining working group providing advice, data, and analysis to the NPGS, to a specific commodity organization, and others.

Functions and activities of the advisory committees have been largely drawn from the 1979 report of the National Plant Genetic Resources Board to the Secretary of Agriculture entitled, "Plant Genetic Resources: Conservation and Use" which proposes an eight-

phase plan for conservation and use of plant genetic resources. This eight-phase plan has been recommended as the point of departure for the work of the crop committees. Further, a Working Group of the NPGRB has recommended that the Assistant to the Deputy Administrator for Germplasm have both a staff and budget to facilitate the initial work of the advisory committees in addressing the following issues:

1. Develop crop-specific descriptor definitions for crop/plant characteristics of importance to breeders and other users;
2. Plan effective evaluation projects on sets of descriptors and germplasm agreed by the committee as being of priority importance;
3. Devise guidelines for sampling (acquiring) genetic diversity, monitoring and maintaining it in storage, and in cost-effective regeneration procedures;
4. Plan and advise on germplasm resources development strategies to bring "exotic" material to a more usable status;
5. Serve as an "early warning" channel in cases of impending crop-specific genetic vulnerability;
6. Assure feedback of generated data into the GRIN;
7. Assist in monitoring related activities abroad;
8. Assist in providing work/cost estimates for carrying out various aspects of the crop-specific germplasm program.

To date, 14 advisory committees have been formed: alfalfa, maize, oat, pea, phaseolus, potato, sorghum, soybean, tomato, wheat, cotton, peanut, registry, and maintenance and control. Other commodity groups are expressing growing interest in organizing CACs with the grasses, sunflowers, and forage legumes now organizing. A prioritized list of commodities to be organized into crop advisory committees when feasible to facilitate their work has been recommended by the NPGRB and includes barley and sweet potato.

DATABASE MANAGEMENT UNIT (DBMU)

The DBMU serves as the information resource manager for the National Plant Germplasm System (NPGS). As such, this unit has the major responsibility for the effective operation of GRIN in three broad areas:

- . Technical--to make sure that the system hardware, software, and telecommunications are performing satisfactorily.
- . Policy and standards--to translate NPGS wishes and the standards developed by the various advisory committees into effective procedures.
- . Service--to advise, assist, and train the end users of the system.

Successfully carried out, these responsibilities will bring the initial system into service and maintain it. In addition, there is likely to be some future development activity to extend and enhance the system. Extension may be into new curation sites or may be into new areas of activity at the initial sites. Enhancement is the improvement of services to users and may be provided by the DBM Unit or may be created by people using the system at the user (curation) sites.

USERS OF GRIN

The involvement of two broad germplasm communities is critical to ensure that the information network will be an operational success. First is the supply community who acquire, maintain, and distribute germplasm and data. This includes the Plant Introduction Office (PIO), the National Seed Storage Laboratory (NSSL), the Small Grains

Collection (SGC), the Regional Plant Introduction Stations (RPIS), and those major curation sites not directly tied to a Regional Station (e.g. IR-1 and soybeans).

The second group of GRIN users is the demand community which refers to the users of germplasm and data. The demand community consists of bonafide researchers in Federal, State, and private institutions.

GRIN has been designed to support the activities of both communities although some functions and features (such as inventory maintenance, taxonomy maintenance, and introduction) are for the use of the supply community only.

GRIN DATA

At the center of the information system is data. Five broad categories of data can be distinguished:

1. Characteristic data, which is data recorded on various aspects of growing plants in terms of descriptors or variables of interest to germplasm workers. Crop Advisory Committees are defining descriptors to serve as standards for germplasm work in the United States.
2. Registry data, which is data recorded when the accession is introduced into the germplasm system. The GRIP Registry Committee has recommended a set of descriptors to be used in GRIN.
3. Inventory data, which describes the status and condition of germplasm in storage. A GRIP Maintenance and Control Committee has been formed to advise on descriptors and procedures for data on germplasm maintenance.

4. Activity data An example is data on the movement of germplasm in the system, to capture information on transfer of germplasm between sites, distribution to end users, and replenishment in the field. Another example is data on exploration and acquisition efforts.
5. Service data. This includes standardized terms of taxonomy and geography used in the system and data on people ("cooperators") who use the system.

Each kind of data is provided for in the information system, and as GRIN evolves other kinds of data can be accommodated. The entry, maintenance and use of data will be controlled in a variety of ways depending upon the role of the data in the system and on the needs of the various users. Registry data and taxonomic terms will be highly standardized in the system and will be changeable only through broad or expert agreement. Characteristic data will include data recorded according to Crop Advisory Committee standards, but also data recorded according to less formal standards; entry of characteristic data will generally be under the control of the crop curator. Users of the system will control temporary data, such as print files, which is generated in a short term use of the system. Controls on privacy and access to data are also being built into the information system so that data owned by one curator site cannot be read without permission by people outside that site.

Several points need to be explained regarding the role of data standards in the information system. Data standards are needed for communication and interpretation of data values. The software supports data standards but it does not of itself impose them; that is the responsibility of the various advisory committees. The severity and stringency of data standards, from official and stringent to no

explicit standards at all, can be graded and designed as required by circumstances. Data standards should be regarded as a tool whose usage will be determined by the needs of the users of the information system.

IV. EVALUATION OF RESEARCH WITH RESPECT TO THE ORIGINAL RESEARCH PROPOSAL

The purpose of this research project was to determine the feasibility of a genetic resources information system for Israel which is compatible with those in other countries. The feasibility of such a system must be evaluated with both the functional and implementation aspects in mind. A functional evaluation defines the need for an information system, its operation and activities which the system is composed of. Feasibility aspects of the system evaluate the existing organizations, cooperation and communication between users, and the level of effort required for orientation and training of the User Services Group. Feasibility of both the functional and implementation aspects will determine the likelihood of development and operation of a successful information system.

FUNCTIONAL AREAS

ACTIVITIES

Functions are services or operations which the user community (researchers, curators, and scientists) will need to efficiently perform their germplasm activities. The functions listed below are recommended for first consideration. As the system evolves more functions can be added.

Of prime importance to the system is storage and retrieval of germplasm data. Included in the data is:

- Inventory data - What material has been collected and stored.
- Collection data - Observations made during collection of material.

- Maintenance data - Quantities of material on hand and available.
- Climatic/ecological data - General climate data for Israel.
- Cooperator data - Researchers and scientists working on germplasm in Israel.
- Evaluation Data - Information collected during evaluation of germplasm material.

OUTPUTS from the system should include:

- Inventory Catalogs
- Cooperator Lists
- Annual Reports
- Germplasm Catalogs
- Climatic Summaries
- Ecological Summaries
- Plant Characteristic Data Reports
- Statistical Analysis of Characteristic Data

USERS

The genetic resources system must accommodate the needs of many users. Included in this group of users are;

- Genebank Personnel
- Public Breeders
- Private Breeders
- Researchers
- Administrators

People from each group will require information and/or access to specific data.

ADVISORY COMMITTEES

Advisory Committees will continue to function as the primary source of recommendation for implementing and maintaining the information system. The advisory committees will also be responsible for determining the types of data that are to be entered into the system and monitoring data.

COMMUNICATIONS

Many of the computer operations will be performed by the User Service Group on terminals located near the Plant Introduction Office, at the Volcani center. These terminals will be connected through a hardwire connection to the Weizmann Institute. The User Services Group will be responsible for overseeing data entry, monitoring data files, and retrieving data in requested form for individuals and groups working with germplasm.

In areas where telephone communications are good, direct file access can be provided to researchers interested in working with the data. However, this option is not feasible in Israel at this time. Microcomputers, functioning as smart terminals, can also be used for distributed processing, a method in which subsets of data are downloaded into smaller machines for manipulation and analysis. Transfer of data can occur through mail on 5 1/4 microcomputer diskettes. Exchange of data between the U.S. and Israel can also occur by way of magnetic tapes.

HARDWARE/SOFTWARE

The Plant Introduction Office will be the heaviest user of the information system; therefore it should be given first consideration when selecting computing facilities. A large mainframe or minicomputer is needed for development of the system. The computer must be capable of handling large quantities of data, support major computing languages, and provide statistical capabilities. The accessibility of the facilities is an important cost consideration. The Weizmann computing center located at the Weizmann Institute was chosen for these reasons. Prototype development has been taking place on an IBM 370/168 using Wylbur as a text editing and programming language for creating SAS (Statistical Analysis System) jobs run in batch mode. SAS files have been used for storage and retrieval of data. At this early stage of development, these software packages appear to be adequate for the amount of data that will be involved in the near future. A number of Wylbur communication packages have been developed for microcomputers which will support plans for distributed processing.

An IBM 3276 CRT (Cathode Ray Tube) computer terminal was purchased by the PIO with funds from this BARD Proposal. The terminal, along with a printer which has yet to be purchased, will constitute a work station. A modem has also been purchased which enables the terminal and printer to communicate with the computer. In the future, microcomputers should be linked to the computer to create disks for distributed processing.

OPERATIONS

With hardware and software in place, the PIO will be able to provide user services to the germplasm community. Users services functions will include:

- overseeing data input
- generating reports and catalogs
- maintaining inventory data
- interacting with the Crop Advisory Committees

IMPLEMENTATION ASPECTS

Implementation of an information system capable of servicing the needs of the Israeli germplasm community will require the cooperation of many people and organizations. A computer system designed without consideration of the climate in which it will be developed and implemented risks failure, therefore the following issues are of great importance.

TRAINED STAFF--Development of the system requires personnel familiar with both plant germplasm and computer systems. A team of researchers trained in these disciplines must be formed. Currently, key PIO staff are being prepared for the task of creating and operating the information system. However, a lack of experienced computer systems analysts in Israel could slow project development until PIO staff are brought up to speed.

DATA TO TEST THE SYSTEM--The information system will operate on data collected and submitted by the germplasm community.

To date, only a small amount of data has been entered into the prototype systems developed during the feasibility study. Better definition of data which researchers will need and a determined effort to collect and enter this data are needed.

ADVISORY GROUPS TO PROVIDE RECOMMENDATIONS--The best source of information and recommendations for creation and operation of the system are those who will use the system. Crop and Operational Advisory committees have and will continue to serve in a consulting roles. Many committees have been formed but to date some groups have not met to address important issues.

PROJECT MANAGEMENT--The key element in the success of the information system is a well organized, knowledgeable project manager able to guide the system development. Preparation of Israeli personnel for this task will require substantial of training.

Planning and organization of the information system to handle activities conducted by users of the system are crucial to the success of the system. Implementation of the genetic resources information system feasibility study appears to be in need of greatest attention at this time. There is an urgent need for an effective information storage and retrieval system; however the climate for creation of this system must first be addressed. With adequate preparation and management, a successful information system can be developed and operated in Israel.

V. DESCRIPTION AND RESULTS OF COOPERATION

Cooperation between Israel and the United States in development of a genetic resources information system for Israel has not only benefited both countries, but germplasm activities around the world.

Israel is a country rich in genetic resources. Efforts to organize collection, evaluation, maintenance and distribution of material benefits all countries that use genetic resources. Likewise, data standards created by the crop advisory committees and information system functions developed and tested in Israel advance the knowledge of genetic resources information systems and their use.

Israel has also benefited from experience gained by the United States in development of the Germplasm Resources Information Network (GRIN). LISA has incorporated elements of the GRIN design into the Israeli system, making the two compatible. This in turn increases the exchange and utilization of genetic resources for improvement of cultivated crops.

The information systems in both countries are at an infant stage of development with plans for growth and expansion. Professional contacts created by work conducted in this project should continue to generate cooperation between scientists in the United States and Israel.

APPENDICES

APPENDIX A
ISRAELI CROP ADVISORY COMMITTEES

A. Winter Grains - wheat, barley, oats

Professor M. Pinthus, Chairman (1982 - 83)

Professor Z. Eyal

Dr. A. Grama

Professor A. Dinour

Dr. M. Kislev

B. Pulses (Legumes for Grain) - chickpeas, green peas, beans

Professor G. Ladizinsky, Chairman

Dr. U. Plitman

Professor R. Kenet

Dr. B. Retig

C. Vegetables (Solanace)

Professor R. Frankel, Chairman

Professor Y. Rudick

Dr. H. Shiffris

D. Other Vegetables (lettuce, carrots, garlic, onion)

Dr. Y. Venture, Chairman

Dr. D. Globerson

Dr. H. Rabinowich

E. Cucurbitaceae

Professor E. Galun, Chairman

Mr. D. Soloman

Dr. Z. Karchi

F. Ornamentals

Dr. A. Hagiladi, Chairman

Dr. M. Avisai

Dr. Nova Eshed

Dr. Y. Bein

Dr. Ora Horovich

M. Y. Yafe

G. Fodder Crops and Pasture

Dr. N. Zeligman, Chairman

Mr. M. Forti

H. Industrial Crops (Cotton, Safflower, Peanuts etc.)

Professor A. Marani, Chairman

Professor Ashri

Dr. Z. Dor

I. Medical and Spice Plants

Dr. A. Levy, Chairman

Dr. E. Putievsky

Dr. I. Friedman

J. Native Plant Collections

Professor A. Dineor, Chairman

Dr. Y. Anikster

Dr. A. Beilis

Professor D. Zohari

Professor Y. Veizel

Professor G. Ladizinsky

Dr. Aviva Rabinowich

K. Orchards and Subtropical Trees

Dr. O. Reuveni, Chairman

Professor S. Levi

Dr. Edna Tane

Dr. Y. Bartal

Dr. A. Erez

APPENDIX B

ISRAELI GENE BANK COMMITTEE

1.	Moshe Feldman, Weizman Institute	Chairman	(Wheat)
2.	Jacob Venture, Hazera Seed Co.		(Onion)
3.	Amos Dinoor, Faculty of Agriculture		(Wheat)
4.	Miriam Waldman, Nat. Fund for Res. and Dev.		(Admin)
5.	Meir Forti, Ben Gurion University		(Desert Plants)
6.	Jacob Manistarski, Tel-Aviv University		(Small Grains)
7.	Clara Chen, Hebrew University		(Taxonomy)
8.	Oded Reuveni, Volcani Centre		(Trees)
9.	Menahem Zur, Volcani Centre		(Gene Bank Director)

APPENDIX C

PLANT INTRODUCTION OFFICE STAFF

1.	Menachem Zur	Director
2.	Ezra Ben-Moshe	Agronomist
3.	Dan Shafferman	Agronomist
4.	Mayra Manoah	Secretary
5.	Sarit Pellech	Data Technician
6.	Ofira Mehler	Data Technician
7.	Zuriel Levin	Data Technician

APPENDIX D

Project Update - 1983/84

During this period we expanded the activities developed and tested in the three previous years, with the goal of developing a comprehensive information system for the Israel Gene Bank capable of exchanging data with the information systems in the United States and other countries.

Specific activities for this year include:

1. Establish a comprehensive data File on the Israel germplasm community. This file provides the Gene Bank staff and the germplasm community with a source of information on the researcher and his general area of expertise as well as information on how to contact him.
2. Continue data collection and entry: collection and entry of data in wheat, onion and barley gathered from different researchers in Israel ; evaluation using computer tools.
3. Maintain developed software: computer software programs developed during the last two years in assisting the Gene Bank staff and the research community in collecting, entering and retrieving data.

During this year we modified the computer programme. The Wylbur text editing and programming language for creating SAS jobs was changed by CMS editing and programming language. Many researchers have access now to the data collected during this last year for search and analysis.

Policy issues such as who is to be given access, what data will be accessible was made during this year by the Gene Bank directory.

We also defined the detailed descriptors and descriptor states for wild wheat and onion.

The ongoing files have been prepared:

1. Observations in the collector area
 - 1.1. Location of sample collected
 - 1.2. Topographical characters
 - 1.3. Climatic conditions
 - 1.4. Phytosociological characters
 - 1.5. Phytopathological data
2. Laboratory data
 - 2.1. Evaluation in the experimental plot
 - 2.2. Phytopathological data in greenhouse
 - 2.3. Phytopathological data in the open experimental field.

The main activity during this year was the collection of data on wheat and onion from the researchers and private companies dealing with these two crops.

Gathering of the data took longer than expected because of technical constraints such as the willingness of the research to cooperate with the Gene Bank, the amount of information he is ready or able to give etc.

For each descriptor we developed maximum descriptor states which will be able to give us maximum information about the genetic material received from the donor.

4. Crop Advisory Committee Meetings

Twelve Crop Advisory Committees have been established to date for the purpose of providing recommendations on germplasm activities for a specific crop category. Members of the research team have in the past and during this year assisted the crop committees by participating in meetings, providing information, requiring recommendations of specific issues and providing reporting services.

APPENDIX E

USERS MANUAL

Registration process for new Introductions at the Gene Bank.

- 1) Introduction: The registration process for data entry is a model developed for plant introduction prototype at the Gene Bank. As such, this system is designed as a demonstration tool for the community of agricultural scientists, farmers' organizations, private seed companies which are involved in the national system of genetic resources.

The prototype has three functions:

1. To receive and record data on plant materials introduced into the Israel National Gene Bank. The stored information will be available for use in other Gene Bank functions such as Maintenance and Control, and Information Exchange when these functions are implemented.
2. To produce reports on the introduced material. The first report, which is available as a replacement for the older DPI reports, is a summary of information on accessions introduced in the most recent reporting period.
3. To update the schedules for use by the curator at the DPI for timing requests for data from people who have received germplasm through the DPI.

The prototype uses more than one card to get the required information. This allows the input formats to be designed to fit the function rather than to fit a single card. It also allows as much data to be input as is desired, and with formats designed for efficiency and readability.

A group of seeds or introductions arriving together will be called a Batch. Even if there is just one packet of seeds in the shipment, it will still be called a Batch. Some information is required to describe the Batch:

(1) name of the person who requested the seed; (2) name of the person who contributed the seed; (3) date when it arrived, and so on. There is a place on the input forms for the Batch data, and this will be

described in detail next.

There are one or more Introductions, e.g. seed packets or "accessions" in a Batch. Information must be recorded on each introduction: genus, species, quantity of seed received, and so on. This is similar to what has always been recorded at the DPI, but there is more space available to spell out names and comments.

There is one other kind of data input, for which a form is also provided, the Text type. This is experimental and is strictly optional; Text need never be used if it is not desired. It will be described, nevertheless, after the Batch and Introduction Input Records are described.

I. Batch Record (two cards)

Look at the sheet with the Batch records on it. Each row on the sheet has a left card and a right card on it. The left card starts with Version followed by Today's Date and ends in column 80 with a field named Delete. The right card begins to the right of that with the field called Version again. One row, which as we have seen, consists of two cards, takes all the input describing a Batch of seeds or introductions. Each data field is labelled on the form and below the field name is a space for the data, consisting of one or more columns. Version has one column for data, for example, while Today's Date has seven columns. We will now work through the fields for the two cards which make up a Batch record.

Version

The value 1 is already printed on the form so it does not need to be written in. It must be punched however.

Today's Date

If today's date is August 2, 1983, it should be written as 02AUG83 - day, month, year with the abbreviation for the month formed by using the first three characters from the name of the month:

January	JAN
February	FEB
March	MAR
April	APR
May	MAY
June	JUN
July	JUL
August	AUG
September	SEP
October	OCT
November	DEC

02 AUG, can also be written 2AUG83 or 2 AUG83.

Batch Number

This is just a number assigned to the Batch. A Batch number is used (by the program) to uniquely identify a Batch. Just as each new plant introduction is assigned a new Introduction Number which is never repeated, so each Batch should receive a new number starting with 1. The field for Batch Number has five columns, but the number can be written anywhere in those five columns. It is probably best to write in the leftmost columns for consistency. When it is time to describe the input forms for the Introductions, we will see that this Batch Number is used again on those forms. Each Introduction in a Batch will receive the Batch Number.

Requestor Name and Affiliation

Since this field comes in the Requestor part of the form, it is used to record information about the person who requested the seed. Usually this will be the worker in Israel who asked the DPI to get the seeds. A consistent way of recording names should be established. For example:

Zur Menachem
Schafferman Dan
Rabinovich Haim

The place where the person works ("affiliation") should also go into this field; the full field then looks like this:

Zur Menachem Volcani Center
Schafferman Dan Volcani Center
Rabinovich Haim Faculty of Agriculture

Requestor Country or State

Since most requestors who use the DPI are in Israel, most Batch records will have "Israel" in this box. If the requestor is from the United States, the state can be put into the box.

Requestor Phone in Israel

This is just the phone number of the requestor, if it is known. This number will go into the Tweaker File, to be used when the DPI wants to ask for information on seeds provided to the requestor by the DPI.

Tweaker Date

This is the date when the requestor should be called for a report on the seed. The curator (Menachem Zur) should provide this date. If the Tweaker Date is not filled in, then Today's Date will be placed in the box by the computer. There is nothing wrong with that, but if a better date is available it should be entered. This date has the same form as Today's Date, which was described earlier. If December 1, 1984 is the Tweaker Date wanted, it should be written

01DEC84

or

1DEC84

or

1 DEC84

Delete

This field, in column 80 of the first card should be ignored.

At this point the first card is finished. It may not be possible or necessary to fill out all the data fields. The only fields which

must be filled in are:

Today's Date

Batch Number

Columns 1 to 16 of the second Batch card should just be duplicated on the keypunch, so the second card gets the same Version, Today's Date, and Batch Number as the first Batch card.

Donor Name and Affiliation

This field looks just like the Requestor Name and Affiliation but it is in the Donor part of the card so it is used to record information on the person who supplied the seed to the DPI. The rules used for Requestor Name and Affiliation should be used for Donor Name and Affiliation.

Donor Country or State

Since many of the seeds received by the DPI come from abroad, the entry here will usually be a foreign country. If the plant was collected or produced in Israel, then "Israel" should go into the box.

Comments on the Batch

Anything can be written in here which pertains to the entire batch of seeds, not just to individual accessions in the batch. For example, if the requestor wanted the seeds for salt water tolerance screening, then that fact could be written in this field. If individual introductions in the Batch need comments recorded, a way to do it will be described later in the Text section.

Delete

This field, in column 80 of the second card, should be ignored.

At this point the new Batch of introductions has been described. Each introduction, e.g. seed packet or "accession" must now receive data and that is the topic of the next section.

II. Introduction Record (two cards)

A record for an introduction is, like a Batch record, made up of two cards. Introduction record blanks are on the Introduction sheets. They are generally similar to the Batch records, but, of course, most of the data fields are different. Each introduction, e.g. seed packet or "accession" gets a row on this form. A thing to notice is that near the left of the card, in columns 3-6 is the Batch Number. This is not a new Batch Number, but just the Batch Number taken from the Batch record. Remember that a Batch contains or "owns" introductions. If there is a Batch Number equal to 1 on the Batch record, then any Introduction records which also have Batch Number equal to 1 belong to that Batch. This is important for reports because the introductions which belong to a Batch will be printed with that Batch.

Version

The value 1 is already printed on the form so it does not need to be written in. It must be punched however.

Batch Number

As just explained, this number is carried over from the Batch record. All introductions belonging to a Batch should receive the same Batch number.

Introduction Number

This is just the Introduction Number which has always been assigned to introductions at the DPI. There should be no changes in procedure here. The Introduction Number can be written into the box provided for it in any way desired. For consistency and readability it might be best to start it in column 3.

Genus

The genus name written out in full.

Species

The species name written out in full.

Origin

The country or state where the introduction came from originally. The name of the country or state is to be written out. The true origin may be unknown or uncertain, or Origin can be left blank.

Quantity Stored

This is the number of seeds stored at the DPI after the requestor has been supplied with seed. If no seeds are stored, put a zero (0) in this box.

Crop Code

Standard Department of Plant Introduction code.

Type Code

Standard Department of Plant Introduction code.

Procedure

Standard Department of Plant Introduction code.

Movement

Standard Department of Plant Introduction code.

Can

Number of the storage can which is standard at the DPI.

Delete

This field, in column .80 of the card should be ignored.

At this point the first card is finished. It may not be possible or necessary to fill out all the data fields. The only fields which must be filled in are:

Batch Number

Introduction Number

Columns 1 to 13 of the second Introduction card should be duplicated on the keypunch, so the second card gets the same Version, Batch Number and Introduction Number as the first Introduction card.

Variety Name

The Variety Name should be spelled out here. It has been common practice at the DPI to write the Genus or Species name along with the Variety Name. This is no longer necessary since more space has been provided for Genus and Species.

Variety Name is the only data field on this card at present. The card is blank after column 55 except for Delete in column 80 which should be ignored. When the Batch record and the introduction records belonging to the Batch are completed, the necessary information for processing a shipment of incoming seed is complete. The prototype allows other information to be stored with each introduction, however.

III. Text Record (one card)

This is a special input form for this kind of record also. The Batch and Introduction records are formatted records in the sense that they contain data fields and each data field has a specific purpose. The field named Genus receives the genus name, the field named Batch Number receives the number assigned to the Batch, and so forth. An exception is the Comments field in the Batch record. This field is used to record any information about the Batch which does not fit the other data fields in the Batch record. The Text records(s) are similar to a Comments field for each plant introduction except that the amount of information that can be stored is unlimited. A Text record fits on one card, but by using 1, 2, 3 ... 50 cards enough space is available to record whatever information needs to be recorded for an introduction. And each introduction can have as many cards or records as are needed. The Text records are optional and may be dropped after a trial period, or may prove very useful for the DPI.

Version

The value 1 is already printed on the form so it does not need to be written in. It must be punched however.

Introduction Number

Text records belong to introduction records since a Text record is used to record information on a specific plant introduction. The field for Introduction Number tells the program which plant introduction owns the Text record. If 10 Text records are needed for a certain plant introduction, e.g. number 34320, then each Text record should contain Introduction Number 34320.

Sequence Number

This is just a unique number assigned to the record for use by the computer. The DPI has experience in assigning unique numbers: each new plant introduction receives a new (unique) plant introduction number. Similarly, a new Sequence Number should be assigned to each new Text record; the first Sequence Number ever assigned should be 1, the next would be numbered 2, the next 3, and so on.

Text Type - 1

This is the next field on the form, but it will be described later under Text Type - 2 after the Text field has been described.

Text

This field runs from column 22 to column 79, a total of 58 columns. This area can be used to record any data about the plant introduction which owns this Text record. It should be treated like one line on a sheet of paper which is used to write a description. The space does not have to be filled; there is no need to be "efficient" by filling space to avoid waste. The person filling out the form should try to make the writing neat, readable, and complete. If the Text is made up of sentences, the sentences can continue from card to card for as long as is needed. It is best in thinking about Text to ignore everything outside of the Text field (columns 22-79) and visualize columns 22-79 as a clean pad of paper with lines for writing.

What kind of information should go into Text? First of all, Text can function as a Comments field for the plant introduction which owns the Text. Any kind of notes or observations about the

introduction can be entered as desired.

Examples are:

1. reason the plant was introduced into Israel
2. donor's comments on the plant (from his letter)
3. quarantine problems and results
4. problems or results in growing the plant at the DPI
5. requestor's comments or information evaluation of the plant

Another kind of data which can be recorded here is bibliographic or literature references giving information about the plant. If there are many literature references for a certain plant introduction they can all be recorded on Text records.

Another kind of data that can be recorded under Text is evaluation data which the requestor returns to the DPI. A requestor might receive three accessions through the DPI and during evaluation record data on seven descriptors. When this data is recorded at the DPI it can be recorded in the Text which is owned by each of the three plant introductions. Standard methods for expressing and labelling the data should be produced to make the data most useful.

What happens to information which is stored under Text? First, it is available for reports, whether the standard DPI catalog or other reports. Second, since it is machine-readable it can easily be transferred to other programs, such as a query system. Third, it is easily available for review by people interested in a certain plant introduction. The production of reports and catalogs brings us back to the topic which we by-passed above - the purpose of Text Type, a field on the Text record.

Text Type - 2

Since Text can handle so many kinds of information, there should be a way to mark it for quality, relevance to many people, and restrictions. That is the purpose of the Text Type field on the Text record or card. Four characters have been provided in columns 16 - 19 for that purpose. The idea is to design a scheme of codes which can be used to classify all Text records. This will require some work but for illustration the following codes are suggested:

LETR: The information stored in the current TEXT
 record came in the donor's letter which
 accompanied the seed.

REF: A literature reference.

NOTE: Just a note inserted in the file.

EVAL: Evaluation data returned by the requestor.

Codes will these can be used to control which TEXT records
 are printed in reports. Maybe in the DPI catalog only literature references
 are wanted. The computer will then select and print only those TEXT
 records for which the TEXT TYPE is REF. For other reports maybe both
 literature references and evaluation data should be printed. Then REF
 and EVAL would be selected for printing.

One final comment about using TEXT records. Data for a plant
 introduction can be added at any time. There may be no evaluation data or
 literature references when the new plant introduction is first entered into
 the system. If evaluation data arrives, after a year or two, or literature
 references are discovered later, that new information can be recorded under
 TEXT as it becomes available.

Summary of Input Requirements

Batch Record

Number of cards	:	2
Purpose	:	Collect information on a batch of plant introductions
Required Fields	:	Version Today's Date Batch Number

Introduction Record

Number of cards	:	2
Purpose	:	Collect information on each plant introduction
Required Fields	:	Version Batch Number Introduction Number

Text Record

Number of cards	:	Any number
Purpose	:	Allow any type of data to be collected with a plant introduction.
Required Fields	:	Version Introduction Sequence Number Text Type

APPENDIX F

Descriptors for wild wheat and onion. (A prototype for the Israel Gene Bank).

INTRODUCTION

The descriptors for these two crops are based on a model developed for a data base prototype at the Gene Bank. This prototype serves as a demonstration tool for the user's community of agricultural scientists, breeders and private companies which are involved in the national system of genetic resources. There are eight files which include: Collection Data; Topographical and Climatic Information; Morphological Information; Phytosociological and Ecological Information and Phytopatological Information.

FIGURE 2

The organization of the information system
for wild wheat.

FIGURE 3 .

Determine the descriptors for wild wheat.

FIGURE 4

The form of connecting researchers and breeders

FIGURE 5

Input and Output programming of wild wheat
In the computer and its analysis.

All following files have data in storage in the computer, and will follow by examples.

File no' 1 - Collection data

<u>Descriptor</u>	<u>Computer Description</u>
1.1 Accession number	(NUM)
1.2 Country of collection	(COUNTRY)
1.3 Region of collection	(REGION)
Israel is divided into regions, and their abbreviations are given in page no' 69.	
1.4 Place of collection	(PLACE)
1.5 Reference point	(REFPOINT)
Given in 6-8 numbers, the first half is latitude and the second half is longitude.	
1.6 Direction	(DIRECT)
Direction from place at 1.4.	
The value-labels are - S,E,W,N,SE,SW,NE,NW.	
1.7 Distance	(DISTANCE)
Distance from place in Km.	
1.8 Date of collection	(DATE)
1.9 Collector's number	(COLL_NUM)
Each collector has his own number for his accessions.	
1.10 Collector's name	(COLLNAME)
(Most of the times given at the title)	
1.11 Israel gene bank number	(IGB_NUM)

File no' 2 - Topographical and Climatic Information

<u>Descriptor</u>	<u>Computer description</u>
2.1 Accession number	(NUM)
2.2 Altitude	(ALTITUDE)
2.3 Topographical condition	(TOPOSITU)
1 - Plain	
2 - Hill	
3 - Mountain	
4 - Valley	
5 - Slope	
6 - Heights	

2.4 Steepness	(SLOPE)
A - Steep	
B - Terraced	
C - Moderate	
2.5 Direction to sun	(SUNDIREC)
(See no' 1.6)	
2.6 Geological period	(GEOLOGY)
2.7 Bedrock	(BEDROCK)
Dolomite, Basalt etc.	
2.8 Limestone	(LIMESTON)
+ presence blank-absence	
2.9 Type of Soil	(SOIL)
2.10 Mean annual Temperature	(TEMPANNU)
In °C.	
2.11 Mean January Temperature	(TEMPJAN)
In °C.	
2.12 Mean August Temperature	(TEMPAUG)
In °C.	
2.13 Mean annual Precipitation	(RAINANNU)
In mm.	
2.14 Mean annual Relative Humidity	(HUMIDITY)
In %.	
2.15 Mean annual Evaporation	(EVAPORAT)
In cm.	

File no' 3 - Phytosociological-Ecological Information

<u>Descriptor</u>	<u>Computer Description</u>
3.1 Accession number	(NUM or G_NO)
3.2 Primary Habitat	(ECOSYS1)
10 - Forest	
20 - Woods	
30 - Betha and Gariga	
40 - Perennial and annual plants	
3.3 Secondary Habitat	(ECOSYS2)
11 - Natural Pasture	
12 - Nature Reservation	
13 - Fallow Lands	
14 - Residential Area	
15 - Cultivated Area	
16 - Road Edges	

3.4	Trees	(TREES)
3.5	Shrubs	(SHRUBS)
3.6	Perennial plants	(PERENIAL)

File no' 4 - Phytosociological-Ecological Information (cont.)

<u>Descriptor</u>	<u>Computer Description</u>
4.1 Accession number	(NUM or G_NO)
4.2 Annual Plants	(ANNUAL)
4.3 Other Species of the Tribe - Hordeae	(HORDEAE)
4.4 Neighbourhood to cultivated wheat Yes or Blank.	(CULTIVAT)

File no' 5 - Morphological Information

<u>Descriptor</u>	<u>Computer Description</u>
5.1 Accession number	(NUM or G_NO)
5.2 Year of sowing 'N' - Nature collection 80/81, 81/82 etc. - Year.	(YEAR)
5.3 Row number	(ROW_NO)
5.4 Bluish color on Leaves + - presence, blank - absence	(X0)
5.5 Stem height in cm.	(X1)
5.6 Leaf length in cm.	(X2)
5.7 Leaf width in mm.	(X3)
5.8 Sheath bristles + Rough ++ Bristle +- Light Rough - Absent (smooth)	(X4)
5.9 Waxiness on the sheath - Absent + Waxiness ++ Strong waxiness	(X5)
5.10 Spike length in cm.	(X6)
5.11 Spike width in mm.	(X7)
5.12 Spike thickness in mm.	(X8)
5.13 Awn length in cm. (1,2 or 3 awns divided by /)	(X9)
5.14 Awn width 1 - Thin 2 - Middle 3 - Thick	(X10)

5.15 Leaf nominal form	(X11)	
1 - Flat		
2 - Semi-Folded		
3 - Semi-Rolled		
4 - Rolled		
5.16 Spike Pubescence	(X12)	
+ Pubescence		
- Glabrous		
5.17 Glume color= Spike color	(X13)	
BL - Black	BLL - Blackish	BR - Brown
GR - Gray	GRR - Grayish	RD - Red
RDD - Reddish	STR - Striped	WH - White
D. - Dark	L. - Light	
5.18 Glume waxiness	(X14)	
+ Present		
- Absent		
++ Stong Waxiness		
5.19 Glume length in mm.	(X15)	
5.20 Growth Habits	(X16)	
1 - Upright		
2 - Semi-Prostrate		
3 - Prostrate		
5.21 Glume beak length in mm.	(X17)	
5.22 Glume beak width in mm.	(X18)	
5.23 No' of Kernels per Spikelet	(X20)	
5.24 Days to Heading	(X22)	
5.25 Rosette type	(X23)	
1 - Absent		
2 - Prostrate		
3 - Nonprostrate		
4 - Pillow shaped		
5.26 Weight of 1000 kernels	(KERN_WT)	
5.27 Protein percent in experimental field	(PROT_P)	
5.28 Protein percent in wild collection	(PROT_WP)	

- v -

The following files have been prepared for additional information
 which we have not yet received.

- " -

File no' 6 - Phytopathological information on Wild Accessions

6.1 Accession number	(NUM)
----------------------	-------

6.2 Leaf Septoria

(LEAF_SEP)

Level of infection:

- 1 - High
- 2 - Medium
- 3 - Low
- 4 - No Infection

Uniformity of reaction:

- 1 - Reaction is uniform
- 0 - Reaction is not uniform

6.3 Glume Septoria	(See no' 6.2)	(GLUM_SEP)
6.4 Leaf Rust	(See no' 6.2)	(LEAF_RUS)
6.5 Stripe Rust	(See no' 6.2)	(STR_RUST)
6.6 Stem Rust	(See no' 6.2)	(STM_RUST)
6.7 Mildew	(See no' 6.2)	(MILDEW)
6.8 Smut	(See no' 6.2)	(SMUT)
6.9 B.Y.D Virus	(See no' 6.2)	(B_Y_D)
6.10 Ergot	(See no' 6.2)	(ERGOT)
6.11 Level of Development	(On Roman scale)	(DEVELOP)
6.12 Age range of community at collection time.		(RANGE)
(On Roman scale)		

File no' 7 - Phytopathological information in Experimental field

<u>Descriptor</u>	<u>Computer Description</u>
7.1 Accession number	(NUM)
7.2 A (Describes Experimental Field)	(A)
7.3 Place of Growth	(PLACE_A)
7.4 Temperature in °C.	(TEMP)
7.5 Relative Humidity	(HUMID)
7.6 Light Intensity	(LIGHT)
7.7 Fertilization	(FERTILE)
1 - Fertilizer added	
2 - No Fertilizer	
7.8 Fungicides	(FUNGIC)
7.9 Type of Infestation	(TYPE)
1 - Quantitative	
2 - Qualitatively	
7.10 Calculation Method	(CAL_METH)
10 - Number of Spores per volume	
20 - Weight of Spores per volume	
30 - Optical Density of Spore culture	
7.11 Quantity of Spores	(NO_SPORE)

7.12 Plant age at infestation time	(AGE_INFES)
7.13 Stage of Development (On Roman scale)	(DEVELOP)
7.14 Part of plant infected	(PART_INF)
11 - Leaf	
22 - Stem	
33 - Awn	
44 - Glume	
55 - Kernel	

File no' 8 - Phytopathological information in Experimental Field (no' 2)

<u>Descriptor</u>	<u>Computer Description</u>
8.1 Accession number	(NUM)
8.2 A (Describes Experimental Field)	(A)
8.3 Race number	(RACE_NO)
8.4 Race name	(RACE_NAM)
8.5 Leaf Rust	(LEAF_RUS)
Reaction:	
Level of infection in %:	
8.6 Stripe Rust (See no' 8.5)	(STR_RUST)
8.7 Stem Rust (See no' 8.5)	(STM_RUST)
8.8 Mildew (See no' 8.5)	(MILDEW)
8.9 Smut (See no' 8.5)	(SMUT)
8.10 B.Y.D Virus	(B_Y_D)
Severness of infection:	
1 - Little change in color	
2 - Strong change in color	
3 - High infection with some sterility	
4 - Medium Sterility	
5 - Complete Sterility	
% Infected Plants:	
8.11 Ergot	(ERGOT)
Intensity of Infection:	
1 - One Sclerocia per spike	
2 - Some Sclerocium per spike	
3 - Many Sclerocium	
% Infected Plants:	
8.12 Leaf Septoria	(LEAF_SEP)
Level of infection in Flag Leaf in %:	
Infection Evaluation:	
8.13 Glume Septoria (See no' 8.12)	(GLUM_SEP)

In Septoria the evaluation is according to the Saari and Prescott scale.

File no' 9 - Phytopathological information in Greenhouse

<u>Descriptor</u>	<u>Computer Description</u>
9.1 Accession number	(NUM)
9.2 B (Describes Greenhouse)	(A)
9.3 See no' 7.3	
9.4 See no' 7.4	
9.5 See no' 7.5	
9.6 See no' 7.6	
9.7 See no' 7.7	
9.8 See no' 7.8	
9.9 Type of infestation	(INFESTYP)
1 - Artificial	
2 - Natural	
9.10 See no' 7.9	
9.11 See no' 7.10	
9.12 See no' 7.11	
9.13 See no' 7.12	
9.14 See no' 7.13	
9.15 See no' 7.14	
9.16 Type of Inspection	(INSPECT)
1 - Inspection on the whole plant	
2 - Inspection on separate parts	

File no' 10 - Phytopathological information in Greenhouse (no' 2)

<u>Descriptor</u>	<u>Computer Description</u>
10.1 Accession number	(NUM)
10.2 B (Describes Greenhouse)	(A)
10.3 to 10.13 are the same as in File no' 8.	

File no' 1 - Collection data

<u>Descriptor</u>	<u>Computer Description</u>
1.1 Accession number	(NUMBER)
1.2 Genus	(GENUS)
A - Allium	
1.3 Species	(SPECIES)
1.4 Sections	(SECTION)
1.5 Collection Institute	(COL_INST)
F - Faculty of Agriculture	
1.6 Date of collection	(DATE)
1.7 Country of collection	(COUNTRY)
1.8 Region of collection	(REGION)
Israel is divided into regions, and their abbreviations are given on page no' 69.	
1.9 Reference Point	(REFPOINT)
Given in 6-8 numbers, the first half is latitude and the second half is longitude.	
1.10 Place of collection	(PLACE)

No further data has been received. New files are being prepared for fresh data; as in the case of wheat.

CODED NAMES FOR ALL REGIONS IN ISRAEL

13:05 SUNDAY, AUGUST 12, 1984

1

OBS	TITLE	X	MEANING
1	ACD	-	ACCO PLAIN
2	AMN	-	AMMON
3	ARA	-	ARAVA VALLEY
4	BSV	-	BAIT-SHEAN VALLEY
5	CAR	-	Mt. CARMEL
6	CCR	-	COAST OF CARMEL
7	CGL	-	COASTAL GALILEE
8	DAN	-	DAN VALLEY
9	DDS	-	DEAD SEA ARIA
10	DSM	-	SAMARIA DESERT (SAM)
11	EDM	-	EDOM
12	ELT	-	EILAT (SNG)
13	GIL	-	Mt. GILBOA
14	GLD	-	GILEAD
15	GOL	-	GOLAN
16	HER	-	HERMON
17	HNG	-	CENTRAL NEGEV-MOUNTAIN OF NEGEV
18	HUL	-	HULA PLAIN
19	IZR	-	ESDRAELON PLAIN (ISRAEL VALLEY)
20	JDD	-	JUDEAN DESERT
21	LBN	-	LEBANON
22	LGL	-	LOWER GALILEE
23	LJV	-	LOWER JORDAN VALLEY
24	MJD	-	JUDEAN MOUNTAINS
25	MNS	-	MENASHE HEIGHTS (SAM)
26	NOV	-	MOAV
27	MSM	-	SAMARIA MOUNTAINS (SAM)
28	NNG	-	NORTHERN NEGEV
29	SAM	-	SAMARIA
30	SCP	-	SOUTH COASTAL PLAIN = PHILISTEAN PLAIN
31	SHF	-	SHFELA (HILLS)
32	SHR	-	SHARON PLAIN
33	SIN	-	SINAI
34	SNG	-	SOUTHERN NEGEV
35	TUR	-	TURKEY
36	UGL	-	UPPER GALILEE
37	UJV	-	UPPER JORDAN VALLEY
38	WNG	-	WESTERN NEGEV

DATA RECEIVED BY DR. Z. AMITAI (GERECHTER) & DR. HELLENA GOLDENBERG
INSTITUTE OF PLANT PROTECTION - VOLCANI CENTER

10:35 MONDAY, AUGUST 6, 1984

PROCESSED BY ISRAEL GENE BANK - VOLCANI CENTER

FAMILY - GRAMINEAE TRIBE - HORDEAE
GENUS - TRITICUM SPECIES - TUGRIDUM VARIETY - DICOCCHOIDES

DATA NO 1 - COLLECTION INFORMATION

OBS	PAGENUM	NUM	COUNTRY	REGION	PLACE	REFPOINT	DIRECT	DISTANCE	DATE	COL-LNUM	COLLNAME	IGBNUM
477	1	477	ISR	UJV	KAREI-DESHE	20162545			80580	6	573	IGB0054
478	1	478	ISR	UJV	KAREI-DESHE	20162545			80580	6	574	IGB0055
479	1	479	ISR	LGL	GOLANI JUN.	19432436			110580	6	575	IGB0056
480	1	480	ISR	LGL	GOLANI JUN.	19432436			110580	6	576	IGB0057
481	1	481	ISR	LGL	GOLANI JUN.	19432436			110580	6	577	IGB0058
482	1	482	ISR	LGL	GOLANI JUN.	19432436			110580	6	578	IGB0059
483	1	483	ISR	LGL	GOLANI JUN.	19432436			110580	6	579	IGB0060
484	1	484	ISR	LGL	CHUKQUE	19712542			110580	6	580	IGB0061
485	1	485	ISR	LGL	CHUKQUE	19712542			110580	6	581	IGB0062
486	1	486	ISR	LGL	CHUKQUE	19712542			110580	6	582	IGB0063
487	1	487	ISR	LGL	CHUKQUE	19712542			110580	6	583	IGB0064
488	1	488	ISR	LGL	CHUKQUE	19712542			110580	6	584	IGB0065
489	1	489	ISR	LGL	CHUKQUE	19712542			110580	6	585	IGB0066
490	1	490	ISR	LGL	CHUKQUE	19712542			110580	6	586	IGB0067
491	1	491	ISR	LGL	CHUKQUE	19712542			110580	6	587	IGB0068
492	1	492	ISR	LGL	CHUKQUE	19712542			110580	6	588	IGB0069
493	1	493	ISR	LGL	CHUKQUE	19712542			110580	6	589	IGB0070
494	1	494	ISR	LGL	CHUKQUE	19712542			110580	6	590	IGB0071
495	1	495	ISR	LGL	CHUKQUE	19712542			110580	6	591	IGB0072
496	1	496	ISR	LGL	CHUKQUE	19712542			110580	6	592	IGB0073
497	1	497	ISR	LGL	CHUKQUE	19712542			110580	6	593	IGB0074
498	1	498	ISR	LGL	CHUKQUE	19712542			110580	6	594	IGB0075
499	1	499	ISR	LGL	CHUKQUE	19712542			110580	6	595	IGB0076
500	1	500	ISR	LGL	CHUKQUE	19712542			110580	6	596	IGB0077
501	1	501	ISR	LGL	CHUKQUE	19712542			110580	6	597	IGB0078
502	1	502	ISR	LGL	CHUKQUE	19712542			110580	6	598	IGB0079
503	1	503	ISR	LGL	CHUKQUE	19712542			110580	6	599	IGB0080
504	1	504	ISR	LGL	CHUKQUE	19712542			110580	6	600	IGB0081
505	1	505	ISR	LGL	CHUKQUE	19712542			110580	6	601	IGB0082
506	1	506	ISR	LGL	CHUKQUE	19712542			110580	6	602	IGB0083
507	1	507	ISR	LGL	CHUKQUE	19712542			110580	6	603	IGB0084
508	1	508	ISR	LGL	CHUKQUE	19712542			110580	6	604	IGB0085
509	1	509	ISR	LGL	CHUKQUE	19712542			110580	6	605	IGB0086
510	1	510	ISR	LGL	CHUKQUE	19712542			110580	6	606	IGB0087
511	1	511	ISR	LGL	CHUKQUE	19712542			110580	6	607	IGB0088
512	1	512	ISR	LGL	CHUKQUE	19712542			110580	6	608	IGB0089
513	1	513	ISR	LGL	CHUKQUE	19712542			110580	6	609	IGB0090
514	1	514	ISR	LGL	CHUKQUE	19712542			110580	6	610	IGB0091
515	1	515	ISR	LGL	CHUKQUE	19712542			110580	6	611	IGB0092
516	1	516	ISR	LGL	CHUKQUE	19712542			110580	6	612	IGB0093
517	1	517	ISR	LGL	CHUKQUE	19712542			110580	6	613	IGB0094
518	1	518	ISR	LGL	CHUKQUE	19712542			110580	6	614	IGB0095
519	1	519	ISR	LGL	CHUKQUE	19712542			110580	6	615	IGB0096
520	1	520	ISR	LGL	CHUKQUE	19712542			110580	6	616	IGB0097
521	1	521	ISR	LGL	CHUKQUE	19712542			110580	6	617	IGB0098
522	1	522	ISR	LGL	CHUKQUE	19712542			110580	6	618	IGB0099
523	1	523	ISR	LGL	CHUKQUE	19712542			110580	6	619	IGB0100
524	1	524	ISR	LGL	CHUKQUE	19712542			110580	6	620	IGB0101
525	1	525	ISR	LGL	CHUKQUE	19712542			110580	6	621	IGB0102
526	1	526	ISR	LGL	CHUKQUE	19712542			110580	6	622	IGB0103
527	1	527	ISR	LGL	CHUKQUE	19712542			110580	6	623	IGB0104
528	1	528	ISR	LGL	CHUKQUE	19712542			110580	6	624	IGB0105
529	1	529	ISR	LGL	CHUKQUE	19712542			110580	6	625	IGB0106
530	1	530	ISR	LGL	CHUKQUE	19712542			110580	6	626	IGB0107
531	1	531	ISR	LGL	CHUKQUE	19712542			110580	6	627	IGB0108
532	1	532	ISR	LGL	CHUKQUE	19712542			110580	6	628	IGB0109
533	1	533	ISR	LGL	CHUKQUE	19712542			110580	6	629	IGB0110
534	1	534	ISR	LGL	CHUKQUE	19712542			110580	6	630	IGB0111
535	1	535	ISR	LGL	CHUKQUE	19712542			110580	6	631	IGB0112
536	1	536	ISR	LGL	CHUKQUE	19712542			110580	6	632	IGB0113
537	1	537	ISR	LGL	CHUKQUE	19712542			110580	6	633	IGB0114
538	1	538	ISR	LGL	CHUKQUE	19712542			110580	6	634	IGB0115
539	1	539	ISR	LGL	CHUKQUE	19712542			110580	6	635	IGB0116
540	1	540	ISR	LGL	CHUKQUE	19712542			110580	6	636	IGB0117
541	1	541	ISR	LGL	CHUKQUE	19712542			110580	6	637	IGB0118
542	1	542	ISR	LGL	CHUKQUE	19712542			110580	6	638	IGB0119
543	1	543	ISR	LGL	CHUKQUE	19712542			110580	6	639	IGB0120
544	1	544	ISR	LGL	CHUKQUE	19712542			110580	6	640	IGB0121

DATA RECEIVED BY DR. Z. AMITAI (GERECHTER) & DR. HELLENA GOLDENBERG
 INSTITUTE OF PLANT PROTECTION - VOLCANI CENTER
 PROCESSED BY ISRAEL GENE BANK - VOLCANI CENTER
 FAMILY - GRAMINEAE TRIBE - HORDEAE
 GENUS - TRITICUM SPECIES - TURGIDUM VARIETY - DICOCOCCOIDES

10:35 MONDAY, AUGUST 6, 1984

DATA NO 1 - COLLECTION INFORMATION

FREQUENCY BAR CHART

REGION	FREQ	CUM. FREQ	PERCENT	CUM. PERCENT
UNO	2	2	0.27	0.27
ACD	1	3	0.14	0.41
BSH	2	5	0.27	0.68
CAR	20	25	2.73	3.42
CCR	2	27	0.27	3.69
GIL	25	52	3.42	7.10
GOL	115	167	15.71	22.81
HER	79	246	10.79	33.61
HUL	40	286	5.46	39.07
JDD	9	295	1.23	40.30
JZR	9	304	1.23	41.53
LBN	5	309	0.68	42.21
LGL	72	381	9.84	52.05
MJD	25	406	3.42	55.46
SAM	47	453	6.42	61.89
SHF	3	456	0.41	62.30
SHR	8	464	1.09	63.39
UGL	174	638	23.77	87.16
UVV	94	732	12.84	100.00

FREQUENCY

DATA RECEIVED BY DR. Z. AMITAI (GERECHTER) & DR. HELLENA GOLDENBERG
INSTITUTE OF PLANT PROTECTION - VOLCANI CENTER

10:35 MONDAY, AUGUST 6, 1984 13

PROCESSED BY ISRAEL GENE BANK - VOLCANI CENTER

GENUS - TRITICUM SPECIES - TURGIDUM VARIETY - DICOCOCCOIDES
FAMILY - GRAMINEAE TRIBE - HORDEAE

DATA NO 1 - COLLECTION INFORMATION

FREQUENCY BAR CHART

DATA RECEIVED BY DR. Z. AMITAI (GERECHTER) & DR. HELLENA GOLDENBERG
INSTITUTE OF PLANT PROTECTION - VOLCANI CENTER

10:35 MONDAY, AUGUST 6, 1984

PROCESSED BY ISRAEL GENE BANK - VOLCANI CENTER

GENUS - TRITICUM SPECIES - TURGIDUM VARIETY - DICOCCHOIDES
FAMILY - GRAMINEAE TRIBE - HORDEAE

DATA NO 1 - COLLECTION INFORMATION

FREQ PIE CHART OF REGION

DATA RECEIVED BY DR. Z. AMITAI (GERECHTER) & DR. HELLENA GOLDENBERG
INSTITUTE OF PLANT PROTECTION - VOLCANI CENTER

GENUS - TRITICUM FAMILY - GRAMINEAE TRIBE - HORDEAE
SPECIES - TURGIDUM VARIETY - DICOCCOIDES

DATA NO 3 - ECOLOGICAL INFORMATION

Q_NO	ECOSYS1	ECOSYS2	TREES	SHRUBS	PERENNIAL
1	.	.	OLEA EUROPEAE		
2	.	.	ZIZIPUS SP.		
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DATA RECEIVED BY DR. Z. AMITAI (GERECHTER) & DR. HELLENA GOLDENBERG
INSTITUTE OF PLANT PROTECTION - VOLCANI CENTER

14:10 SUNDAY, AUGUST 12, 1984

GENUS - TRITICUM SPECIES - GRAMINEAE TRIBE - HORDEAE
VARIETY - DICOCOCIDIS

DATA NO 4 - ECOLOGICAL INFORMATION (NO 2)

CULTIVAT

OBS	G_NO	ANNUAL	HORDEAE
1	521		DAUCUS MAXIMUS
2	522		AVENA STER.,
3	523		AVENA STER., HORDEUM BULB.,
4	524		AVENA STER., HORDEUM BULB.,
5	525		HORDEUM BULB.,
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YES
YES
YES
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[illegible]

12:31 SUNDAY, AUGUST 5, 1984 1

DATA RECEIVED BY PROF. M. FELDMAN
INSTITUTE OF PLANT GENETICS - WEIZMANN INSTITUTE

PROCESSED BY ISRAEL GENE BANK - VOLCANI CENTER

FAMILY - GRAMINEAE TRIBE - HORDEAE
GENUS - TRITICUM SPECIES - TURGIDUM VARIETY - DICOCOCCOIDES

DATA NO 1 - COLLECTION INFORMATION

OBS	PAGENUM	NUM	COUNTRY	REGION	PLACE	REFPOINT	DIRECT	DISTANCE	DATE	COLLNAME	COLLNUM1	COLLNUM2	IGBNUM
1	12	1	ISR	HER	MAJDEL-SHAMS	222297			71	A	TTD001	G316	IGB3316
2	12	2	ISR	HER	BIRKAT-RAM	221298			75	A	TTD002	G281	IGB3317
3	12	3	ISR	DAN	KFAR-GILADI	203294			69	A	TTD003		IGB3318
4	12	4	ISR	HJL	ROSH-PINA SEFAT	198264			72	A	TTD004		IGB3319
5	12	5	ISR	HJL	ROSH-PINA SEFAT	198264			72	A	TTD005		IGB3320
6	12	6	ISR	HJL	TUR AN MT.	185242			77	A	TTD006	G265	IGB3321
7	12	7	ISR	L3L	AMIRIM	193291			77	A	TTD007	G307	IGB3322
8	12	8	ISR	U3L	ALMAGOR-KORAZIM	204257			72	A	TTD008		IGB3323
9	12	9	ISR	U3L	ALMAGOR-KORAZIM	204257			72	A	TTD009		IGB3324
10	12	10	ISR	U3L	ALMAGOR-KORAZIM	204257			72	A	TTD010		IGB3325
11	12	11	ISR	U3L	ALMAGOR-KORAZIM	204257			72	A	TTD011		IGB3326
12	12	12	ISR	U3L	AMIRIM	201258			72	A	TTD012		IGB3327
13	12	13	ISR	U3L	NR. AMIAD	201258			72	A	TTD013		IGB3328
14	12	14	ISR	U3L	KOHAV HAYARDEN	195222			72	A	TTD014		IGB3329
15	12	15	ISR	U3L	NURIT RD.	183216			72	A	TTD015		IGB3330
16	12	16	ISR	GIL	BET-ALFA	190212			72	A	TTD016		IGB3331
17	12	17	ISR	GIL	BET-ALFA	190212			72	A	TTD017		IGB3332
18	12	18	ISR	GIL	NURIT NR. FAKUA	187210			72	A	TTD018		IGB3333
19	12	19	ISR	GIL	FAKUA MAALE RD	187210			72	A	TTD019		IGB3334
20	12	20	ISR	CCR	NAHAL OREN ATLI	147235	2.5		73	A	TTD020	G248	IGB3335
21	12	21	ISR	CCR	WADI MILEK	147235			73	A	TTD021		IGB3336
22	12	22	ISR	SAM	WADI ARA	14212			77	A	TTD022		IGB3337
23	12	23	ISR	SAM	TAIBA-RAMALLA	178151			72	A	TTD023		IGB3338
24	12	24	ISR	MJD	BET-MEIR	153123			75	A	TTD024		IGB3339
25	12	25	ISR	MJD	MUSEUM-HILL JER	169132			72	A	TTD025		IGB3340
26	12	26	ISR	MJD	BAIT-VAGAN JER	169132			75	A	TTD026		IGB3341
27	12	27	ISR	GIL	FAKUA GILBOA	187210			72	A	TTD027		IGB3342
28	12	28	ISR	GIL	BET-YA'ABAD	165211			77	A	TTD028		IGB3343
29	12	29	ISR	UNO	ROGELIT EZION R	150120				Z	TTD029		IGB3344
30	12	30	ISR	UNO	LEBANON					Z	TTD030		IGB3345
31	12	31	ISR	LBN	TURKIYA					Z	TTD031		IGB3346
32	12	32	TUR	TUR	TURKIYA					Z	TTD032		IGB3347
33	12	33	TUR	TUR	MAROS					Z	TTD033		IGB3348
34	12	34	TUR	TUR	MAROS					Z	TTD034		IGB3349
35	12	35	TUR	TUR	TUNALI					Z	TTD035		IGB3350
36	12	36	IRN	IRN	IRAN					Z	TTD036		IGB3351
37	12	37	TUR	TUR	GEZIANTEP					Z	TTD037		IGB3352
38	12	38	UNO	UNO						Z	TTD038		IGB3353
39	12	39	UNO	UNO						Z	TTD039		IGB3354
40	12	40	UNO	UNO						Z	TTD040		IGB3355
41	12	41	UNO	UNO						Z	TTD041		IGB3356
42	12	42	UNO	UNO						Z	TTD042		IGB3357
43	12	43	UNO	UNO						Z	TTD043		IGB3358
44	12	44	UNO	UNO						Z	TTD044		IGB3359
45	12	45	UNO	UNO						Z	TTD045		IGB3360
46	12	46	UNO	UNO						Z	TTD046		IGB3361
47	12	47	UNO	UNO						Z	TTD047		IGB3362
48	12	48	UNO	UNO						Z	TTD048		IGB3363
49	12	49	UNO	UNO						Z	TTD049		IGB3364
50	12	50	UNO	UNO						Z	TTD050		IGB3365
51	12	51	UNO	UNO						Z	TTD051		IGB3366
52	12	52	UNO	UNO						Z	TTD052		IGB3367
53	12	53	UNO	UNO						Z	TTD053		IGB3368
54	12	54	UNO	UNO						Z	TTD054		IGB3369
55	12	55	UNO	UNO						Z	TTD055		IGB3370
56	12	56	UNO	UNO						Z	TTD056		IGB3371
57	12	57	UNO	UNO						Z	TTD057		IGB3372
58	12	58	UNO	UNO						Z	TTD058		IGB3373
59	12	59	UNO	UNO						Z	TTD059		IGB3374
60	12	60	UNO	UNO						Z	TTD060		IGB3375
61	12	61	UNO	UNO						Z	TTD061		IGB3376
62	12	62	UNO	UNO						Z	TTD062		IGB3377
63	12	63	UNO	UNO						Z	TTD063		IGB3378
64	12	64	UNO	UNO						Z	TTD064		IGB3379
65	12	65	UNO	UNO						Z	TTD065		IGB3380
66	12	66	UNO	UNO						Z	TTD066		IGB3381
67	12	67	UNO	UNO						Z	TTD067		IGB3382
68	12	68	UNO	UNO						Z	TTD068		IGB3383

DATA RECEIVED BY PROF. M. FELDMAN
INSTITUTE OF PLANT GENETICS - WEIZMANN INSTITUTE

PROCESSED BY ISRAEL GENE BANK - VOLCANI CENTER

FAMILY - GRAMINEAE TRIBE - HORDEAE
GENUS - TRITICUM SPECIES - TURGIDUM VARIETY - DICOCCHOIDES

DATA NO 1 - COLLECTION INFORMATION

FREQUENCY BAR CHART

DATA RECEIVED BY PROF. M. FELDMAN
INSTITUTE OF PLANT GENETICS - WEIZMANN INSTITUTE

12:31 SUNDAY, AUGUST 5, 1984 4

PROCESSED BY ISRAEL GENE BANK - VOLCANI CENTER

GENUS - TRITICUM SPECIES - TURGIDUM VARIETY - DICOCCOIDES
FAMILY - GRAMINEAE TRIBE - HORDEAE

DATA NO 1 - COLLECTION INFORMATION

FREQUENCY BAR CHART

10:25 MONDAY, AUGUST 6, 1984 1

DATA RECEIVED BY PROF. E. NEVO
INSTITUTE OF PLANT EVOLUTION - HAIFA UNIVERSITY
PROCESSED BY ISRAEL GENE BANK - VOLCANI CENTER

FAMILY - GRAMINEAE TRIBE - HORDEAE
GENUS - TRITICUM SPECIES - TURGIDUM VARIETY - DICOCOCCOIDES
DATA NO 1 - COLLECTION INFORMATION

OBS	PAGENUM	NUM	COUNTRY	REGION	PLACE	REFPOINT	DIRECT	DISTANCE	DATE	CELLNAME	IGBNUM
1	1	1	ISR	CAR	MT. CARMEL	15002360			20579	NEVD	IGB2435
2	2	2	ISR	MJD	MAJBA 'A	15701200	W	0.50	90579	NEVD	IGB2436
3	3	3	ISR	GOL	BAT-SHLOMO	15102220			120579	NEVD	IGB2437
4	4	4	ISR	GOL	YEHUDIYA-HUSH	21602660	S	1.00	290479	NEVD	IGB2438
5	5	5	ISR	GOL	KATSRIN	21602660	S	1.00	290479	NEVD	IGB2439
6	6	6	ISR	GOL	KATSRIN	21602660	N	1.00	290479	NEVD	IGB2440
7	7	7	ISR	UJV	KHAY-HAYARDEN	19902600			250479	NEVD	IGB2441
8	8	8	ISR	GIL	MA'ALE-GILBOA	18702090			250479	NEVD	IGB2442
9	9	9	ISR	SAM	GITIT	18701670	E		190479	ZOHAR!	IGB2443
10	10	10	ISR	SAM	NAHAFF	17902600	NE	0.50	190479	ZOHAR!	IGB2444
11	11	11	ISR	UGL	GIV'AT KOAH	14301590			80579	NEVD	IGB2445
12	12	12	ISR	UGL	MT. CNA'AN	19302660			80579	NEVD	IGB2446
13	13	13	ISR	UGL	YABAD (ANIN)	16502110			180579	NEVD	IGB2447
14	14	14	ISR	SAM	MEI-AMI	16402120	E	1.00	180579	NEVD	IGB2448
15	15	15	ISR	SAM	MEI-AMI	16402120			130579	NEVD	IGB2449
16	16	16	ISR	SAM	MEI-AMI	16402120			130579	NEVD	IGB2450
17	17	17	ISR	SAM	MEI-AMI	16402120			130579	NEVD	IGB2451
18	18	18	ISR	SAM	MEI-AMI	16402120			130579	NEVD	IGB2452
19	19	19	ISR	SAM	MEI-AMI	16402120			130579	NEVD	IGB2453
20	20	20	ISR	SAM	MEI-AMI	16402120			130579	NEVD	IGB2454
21	21	21	ISR	SAM	MEI-AMI	16402120			130579	NEVD	IGB2455
22	22	22	ISR	SAM	MEI-AMI	16402120			130579	NEVD	IGB2456
23	23	23	ISR	SAM	MEI-AMI	16402120			130579	NEVD	IGB2457
24	24	24	ISR	SAM	MEI-AMI	16402120			130579	NEVD	IGB2458
25	25	25	ISR	SAM	MEI-AMI	16402120			130579	NEVD	IGB2459
26	26	26	ISR	SAM	MEI-AMI	16402120			130579	NEVD	IGB2460
27	27	27	ISR	SAM	MEI-AMI	16402120			130579	NEVD	IGB2461
28	28	28	ISR	SAM	MEI-AMI	16402120			130579	NEVD	IGB2462
29	29	29	ISR	SAM	MEI-AMI	16402120			130579	NEVD	IGB2463
30	30	30	ISR	SAM	MEI-AMI	16402120			130579	NEVD	IGB2464
31	31	31	ISR	SAM	MEI-AMI	16402120			130579	NEVD	IGB2465
32	32	32	ISR	SAM	MEI-AMI	16402120			130579	NEVD	IGB2466
33	33	33	ISR	SAM	MEI-AMI	16402120			130579	NEVD	IGB2467
34	34	34	ISR	SAM	MEI-AMI	16402120			130579	NEVD	IGB2468
35	35	35	ISR	SAM	MEI-AMI	16402120			130579	NEVD	IGB2469
36	36	36	ISR	SAM	MEI-AMI	16402120			130579	NEVD	IGB2470
37	37	37	ISR	SAM	MEI-AMI	16402120			130579	NEVD	IGB2471
38	38	38	ISR	SAM	MEI-AMI	16402120			130579	NEVD	IGB2472
39	39	39	ISR	SAM	MEI-AMI	16402120			130579	NEVD	IGB2473
40	40	40	ISR	SAM	MEI-AMI	16402120			130579	NEVD	IGB2474
41	41	41	ISR	SAM	MEI-AMI	16402120			130579	NEVD	IGB2475
42	42	42	ISR	SAM	MEI-AMI	16402120			130579	NEVD	IGB2476
43	43	43	ISR	SAM	MEI-AMI	16402120			130579	NEVD	IGB2477
44	44	44	ISR	SAM	MEI-AMI	16402120			130579	NEVD	IGB2478
45	45	45	ISR	SAM	MEI-AMI	16402120			130579	NEVD	IGB2479
46	46	46	ISR	SAM	MEI-AMI	16402120			130579	NEVD	IGB2480
47	47	47	ISR	SAM	MEI-AMI	16402120			130579	NEVD	IGB2481
48	48	48	ISR	SAM	MEI-AMI	16402120			130579	NEVD	IGB2482
49	49	49	ISR	SAM	MEI-AMI	16402120			130579	NEVD	IGB2483
50	50	50	ISR	SAM	MEI-AMI	16402120			130579	NEVD	IGB2484
51	51	51	ISR	SAM	MEI-AMI	16402120			130579	NEVD	IGB2485
52	52	52	ISR	SAM	MEI-AMI	16402120			130579	NEVD	IGB2486
53	53	53	ISR	SAM	MEI-AMI	16402120			130579	NEVD	IGB2487
54	54	54	ISR	SAM	MEI-AMI	16402120			130579	NEVD	IGB2488
55	55	55	ISR	SAM	MEI-AMI	16402120			130579	NEVD	IGB2489
56	56	56	ISR	SAM	MEI-AMI	16402120			130579	NEVD	IGB2490
57	57	57	ISR	SAM	MEI-AMI	16402120			130579	NEVD	IGB2491
58	58	58	ISR	SAM	MEI-AMI	16402120			130579	NEVD	IGB2492
59	59	59	ISR	SAM	MEI-AMI	16402120			130579	NEVD	IGB2493
60	60	60	ISR	SAM	MEI-AMI	16402120			130579	NEVD	IGB2494
61	61	61	ISR	SAM	MEI-AMI	16402120			130579	NEVD	IGB2495
62	62	62	ISR	SAM	MEI-AMI	16402120			130579	NEVD	IGB2496
63	63	63	ISR	SAM	MEI-AMI	16402120			130579	NEVD	IGB2497
64	64	64	ISR	SAM	MEI-AMI	16402120			130579	NEVD	IGB2498
65	65	65	ISR	SAM	MEI-AMI	16402120			130579	NEVD	IGB2499
66	66	66	ISR	SAM	MEI-AMI	16402120			130579	NEVD	IGB2500
67	67	67	ISR	SAM	MEI-AMI	16402120			130579	NEVD	IGB2501
68	68	68	ISR	SAM	MEI-AMI	16402120			130579	NEVD	IGB2502

10:25 MONDAY, AUGUST 6, 1984 3

DATA RECEIVED BY PROF. E. NEVO
INSTITUTE OF PLANT EVOLUTION - HAIFA UNIVERSITY

PROCESSED BY ISRAEL GENE BANK - VOLCANI CENTER

FAMILY - GRAMINEAE TRIBE - HORDEAE
GENUS - TRITICUM SPECIES - TURGIDUM VARIETY - DICOCCHOIDES

DATA NO 1 - COLLECTION INFORMATION

FREQ PIE CHART OF REGION

10:25 MONDAY, AUGUST 6, 1984 4

DATA RECEIVED BY PROF. E. NEVO
INSTITUTE OF PLANT EVOLUTION - HAIFA UNIVERSITY

PROCESSED BY ISRAEL GENE BANK - VOLCANI CENTER

GENUS - TRITICUM FAMILY - GRAMINEAE TRIBE - HORDEAE
SPECIES - TURGIDUM VARIETY - DICOCCOIDES

DATA NO 1 - COLLECTION INFORMATION

FREQUENCY BAR CHART

REGION

REGION	FREQ	CUM. FREQ	PERCENT	CUM. PERCENT
CAR	8	8	11.43	11.43
DAN	1	9	1.43	12.86
GIL	2	11	2.86	15.71
GOL	13	24	18.57	34.29
HER	9	33	12.86	47.14
HUL	1	34	1.43	48.57
JDD	2	36	2.86	51.43
LGL	6	42	8.57	60.00
MJD	3	45	4.29	64.29
SAM	7	52	10.00	74.29
SHF	4	56	5.71	80.00
UGL	12	68	17.14	97.14
UVJ	2	70	2.86	100.00

DATA RECEIVED BY PROF. E. NEVO
INSTITUTE OF PLANT EVOLUTION - HAIFA UNIVERSITY
PROCESSED BY ISRAEL GENE BANK - VOLCANI CENTER
FAMILY - GRAMINEAE TRIBE - HORDEAE
GENUS - TRITICUM SPECIES - TURGIDUM VARIETY - DICOCCHOIDES
DATA NO 1 - COLLECTION INFORMATION
FREQUENCY BAR CHART

DATA RECEIVED BY PROF. E. NEVO
INSTITUTE OF PLANT EVOLUTION - HAIFA UNIVERSITY
PROCESSED BY ISRAEL GENE BANK - VOLCANI CENTER

GENUS - TRITICUM SPECIES - TURGIDUM VARIETY - DICOCOIDES
DATA NO 2 - TOPOGRAPHIC AND CLIMATIC INFORMATION

[illegible]

11:02 MONDAY, AUGUST 6, 1984 1

DATA RECEIVED BY DR. H. RABINOWITCH & ORNA ZELTZER

THE FACULTY OF AGRICULTURE OF THE HEBREW UNIVERSITY, JERUSALEM
DEPARTMENT OF FIELD & VEGETABLE CROPS

DATA NO 1 - COLLECTION INFORMATION

OBS	NUMBER	GENUS	SPECIES	SECTION	COL_INST	DATE	COUNTRY	REGION	REFPOINT	PLACE
1	5	A	ERDELLII	MOLIUM	F	200283	ISR	HER	18151366	HARUTZIM PRESER
2	15	A	ERDELLII	MOLIUM	F	240283	ISR	GOL	24282100	EIN-GEV
3	25	A	ERDELLII	MOLIUM	F	170283	ISR	SCV	14181313	KINERET
4	44	A	ERDELLII	MOLIUM	F	200383	ISR	SCV	14891267	GIVAT-BRENER
5	64	A	ERDELLII	MOLIUM	F	200383	ISR	SCV	18151366	HARUTZIM PRESER
6	137	A	CARMELI	MOLIUM	F	10583	ISR	JDM	12601630	BATIR
7	152	A	CARMELI	MOLIUM	F	170583	ISR	HER	29992181	
8	173	A	CARMELI	MOLIUM	F	260583	ISR	CAR	23781520	BEIT-OREN
9	11	A	NEAPOLITANUM	MOLIUM	F	20383	ISR	GOL	24272100	EIN-GEV
10	12	A	NEAPOLITANUM	MOLIUM	F	20383	ISR	UJV	23392044	EGANIA B'
11	13	A	NEAPOLITANUM	MOLIUM	F	20383	ISR	UJV	23392044	EGANIA B'
12	14	A	NEAPOLITANUM	MOLIUM	F	80383	ISR	JDM	12101485	HIRBEL-SOCHA
13	41	A	NEAPOLITANUM	MOLIUM	F	80383	ISR	JDM	12101485	HIRBEL-SOCHA
14	65	A	NEAPOLITANUM	MOLIUM	F	190383	ISR	LGL	23661837	HIRBEL-SOCHA
15	118	A	NEAPOLITANUM	MOLIUM	F	230383	ISR	LGL	18461350	POLEG PRESERVE
16	136	A	NEAPOLITANUM	MOLIUM	F	230383	ISR	SAM	16131646	DIR-ASANE
17	155	A	NEAPOLITANUM	MOLIUM	F	10583	ISR	SAM	12481627	BATIR/N MAAYNOT
18	49	A	NEAPOLITANUM	MOLIUM	F	170583	ISR	HER		NAHAL SEED
19	72	A	NEGEVENSE	MOLIUM	F	190383	ISR	HER	2981315	
20	73	A	NEGEVENSE	MOLIUM	F	190383	ISR	SNG	2921322	SDE-BOKER
21	74	A	NEGEVENSE	MOLIUM	F	190383	ISR	SNG	12890296	SDE-BOKER
22	86	A	NEGEVENSE	MOLIUM	F	300383	ISR	SNG	99121106	RONEN MOUNTS
23	96	A	NEGEVENSE	MOLIUM	F	300383	ISR	NGH	13651835	WADI-KELT
24	19	A	GASYUNENSE	MOLIUM	F	50483	ISR	JDD	23841574	YAGUR
25	20	A	SUBHIRSUTUM	MOLIUM	F	120383	ISR	CAR	24241510	HAIFA
26	84	A	SUBHIRSUTUM	MOLIUM	F	110383	ISR	CAR	12751704	HAIFA
27	85	A	SUBHIRSUTUM	MOLIUM	F	310383	ISR	CAR	13241485	HAIFA
28	104	A	SUBHIRSUTUM	MOLIUM	F	30483	ISR	CAR	12241450	HAIFA
29	107	A	SUBHIRSUTUM	MOLIUM	F	130483	ISR	JDM	24241510	HAIFA
30	117	A	SUBHIRSUTUM	MOLIUM	F	90483	ISR	SHR	16221585	HAIFA
31	122	A	SUBHIRSUTUM	MOLIUM	F	230483	ISR	CAR	24021454	HAIFA
32	123	A	SUBHIRSUTUM	MOLIUM	F	250483	ISR	SAM	24021530	HAIFA
33	135	A	SUBHIRSUTUM	MOLIUM	F	250483	ISR	CAR	12501627	HAIFA
34	151	A	SUBHIRSUTUM	MOLIUM	F	10583	ISR	JDM	29942190	HAIFA
35	174	A	SUBHIRSUTUM	MOLIUM	F	170583	ISR	HER		KACHEL MOUNT
36	119	A	SUBHIRSUTUM	MOLIUM	F	300583	ISR	HER		
37	28	A	SUBHIRSUTUM	MOLIUM	F	120383	ISR	HER	23841574	
38	53	A	ASCHERSONIANUM	MELANOCROMMYUM	F	140383	ISR	CAR	5951317	MASHASH SANDS
39	55	A	ASCHERSONIANUM	MELANOCROMMYUM	F	260383	ISR	NNG	5851335	MASHASH SANDS
40	106	A	ASCHERSONIANUM	MELANOCROMMYUM	F	50483	ISR	NNG	13751814	KEAR ADUMIM/V. K
41	181	A	ASCHERSONIANUM	MELANOCROMMYUM	F	50483	ISR	NNG	13871834	KEAR ADUMIM/V. K
42	124	A	ASCHERSONIANUM	MELANOCROMMYUM	F	60483	ISR	JDD	23841574	EIN-FUAR
43	42	A	NIGRUM	MELANOCROMMYUM	F	120383	ISR	JDD	23661837	YAGUR
44	174	A	NIGRUM	MELANOCROMMYUM	F	120383	ISR	CAR	25902070	EIN-MAHEL
45	33	A	NIGRUM	MELANOCROMMYUM	F	170483	ISR	LGL	4861390	ALMAGOR
46	81	A	ROTHII	MELANOCROMMYUM	F	140383	ISR	LGL	98961142	MAALE ARD
47	81	A	ROTHII	MELANOCROMMYUM	F	300383	ISR	NGH	71211	
48	103	A	ROTHII	MELANOCROMMYUM	F	30483	ISR	NGH	10701737	
49	186	A	ROTHII	MELANOCROMMYUM	F	30483	ISR	JDD	24802240	SAVION
50	187	A	ROTHII	MELANOCROMMYUM	F	30483	ISR	JDD	18151366	SOUTHERN
51	8	A	TEL-AVIVENSE	MELANOCROMMYUM	F	200283	ISR	GOL	14181313	NOV
52	35	A	TEL-AVIVENSE	MELANOCROMMYUM	F	170383	ISR	SHR	14961260	HARUTZIM PRESER
53	47	A	TEL-AVIVENSE	MELANOCROMMYUM	F	200383	ISR	SHR	14001310	GIVAT-BRENER
54	69	A	TEL-AVIVENSE	MELANOCROMMYUM	F	200383	ISR	SCV	18461350	BEIT-ELAZARI
55	69	A	TEL-AVIVENSE	MELANOCROMMYUM	F	260383	ISR	SHR	19601387	POLEG PRESERVE
56	114	A	TEL-AVIVENSE	MELANOCROMMYUM	F	200383	ISR	SHR	11231068	BEIT-YITZHAK, HAD
57	117	A	TEL-AVIVENSE	MELANOCROMMYUM	F	120383	ISR	SCV	10951095	KARAMIA
58	188	A	TEL-AVIVENSE	MELANOCROMMYUM	F	270383	ISR	SCV	10461749	YAD-MORDECHI
59	68	A	DESERTORUM	CODONOPRASUM	F	270383	ISR	SCV	9181859	ALMOG
60	68	A	DESERTORUM	CODONOPRASUM	F	50483	ISR	JDD	3991596	HAMEI MAZOR
61	109	A	DESERTORUM	CODONOPRASUM	F	50483	ISR	JDD	3811636	NAHAL YAMIN
62	110	A	DESERTORUM	CODONOPRASUM	F	100483	ISR	JDD	10891841	NAHAL MAKA
63	189	A	DESERTORUM	CODONOPRASUM	F	40483	ISR	JDD	12431534	ZUR HADASSA
64	189	A	PALENS	CODONOPRASUM	F	90583	ISR	JDD	24802240	NOV
65	145	A	PANICULATUM	CODONOPRASUM	F	90583	ISR	JDD	12431534	ZUR HADASSA
66	145	A	PANICULATUM	CODONOPRASUM	F	200383	ISR	JDM	12191534	SANSAN PRESERVE
67	2	A	PANICULATUM	CODONOPRASUM	F	210383	ISR	JDM	13661815	HARUTZIM PRESER
68	2	A	STAMINEUM	CODONOPRASUM	F	210383	ISR	SHR		RD. B-S TO M-S

THE FACULTY OF AGRICULTURE OF THE HEBREW UNIVERSITY, JERUSALEM
DEPARTMENT OF FIELD & VEGETABLE CROPS

DATA NO 1 - COLLECTION INFORMATION
FREQUENCY BAR CHART

FREQUENCY	REGION																SYMBOL SECTION		
	CAR	CSP	GIL	GDL	HER	JDD	JDM	LBN	LGL	NGH	NING	SAM	SCP	SCV	SHR	SNG	UJV		
23	DDDDDD	CCCCC	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	DDDDD		
22	DDDDDD	CCCCC	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	DDDDD		
21	DDDDDD	CCCCC	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	DDDDD		
20	DDDDDD	CCCCC	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	DDDDD		
19	DDDDDD	CCCCC	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	DDDDD		
18	DDDDDD	CCCCC	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	DDDDD		
17	DDDDDD	CCCCC	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	DDDDD		
16	DDDDDD	CCCCC	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	DDDDD		
15	DDDDDD	CCCCC	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	DDDDD		
14	DDDDDD	CCCCC	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	DDDDD		
13	DDDDDD	CCCCC	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	DDDDD		
12	DDDDDD	CCCCC	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	DDDDD		
11	DDDDDD	CCCCC	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	DDDDD		
10	DDDDDD	CCCCC	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	DDDDD		
9	DDDDDD	CCCCC	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	DDDDD		
8	DDDDDD	CCCCC	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	DDDDD		
7	DDDDDD	CCCCC	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	DDDDD		
6	DDDDDD	CCCCC	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	DDDDD		
5	DDDDDD	CCCCC	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	DDDDD		
4	DDDDDD	CCCCC	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	DDDDD		
3	DDDDDD	CCCCC	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	DDDDD		
2	DDDDDD	CCCCC	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	DDDDD		
1	DDDDDD	CCCCC	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	AAAAA	DDDDD		

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DATA NO 1 - COLLECTION INFORMATION
FREQ PIE CHART OF SECTION

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DATA NO 1 - COLLECTION INFORMATION
FREQ PIE CHART OF REGION