futur e learning

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e-Learning



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İstanbul, TURKEY
Proceeding

Sevinç Gülseçen (ed.)
Zerrin Ayvaz Reis (ed.)

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Towards To Virtual Herbarium:
ISTF (Istanbul University, Science Faculty Herbarium)

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Abstract: *Istanbul University, Science Faculty Herbarium (ISTF) was instituted by German botanist Alfred Heilbronn in 1934. ISTF has 40.000 recorded plant specimens. Virtual herbarium is a web-based collection of digital images and data of preserved plants or plant parts. Each virtual specimen is accompanied by information on where and when it was collected, by whom, its correct botanical name. In this study, we presented the virtual herbarium studies in ISTF.*

Introduction

Herbarium is a collection of preserved plant specimens. These specimens may be whole plants or plant parts: these will usually be in a dried form, mounted on a sheet, but depending upon the material may also be kept in alcohol or other preservative. The same term is often used in mycology to describe an equivalent collection of preserved fungi.

The term can also refer to the building where the specimens are stored, or the scientific institute that not only stores but researches these specimens. The specimens in a herbarium are often used as reference material in describing plant taxa; some specimens may be types.

Specimen preservation

Preparing a plant for mounting to preserve their form and color, plants collected in the field are spread flat on sheets of newsprint and dried, usually in a plant press, between blotters or absorbent paper. The specimens, which are then mounted on sheets of stiff white paper, are labeled with all essential data, such as date and place found, description of the plant, altitude, and special habitat conditions. The sheet is then placed in a protective case. As a precaution against insect attack, the pressed plant is frozen or poisoned and the case disinfected. As a modern and harmless method, we use deep-freeze in ISTF.

Certain groups of plants are soft, bulky, or otherwise not amenable to drying and mounting on sheets. For these plants, other methods of preparation and storage may be used. For example, conifer cones and palm fronds may be stored in labeled boxes. Representative flowers or fruits may be pickled in formaldehyde or alcohol to preserve

their three-dimensional structure. Small specimens, such as mosses and lichens, are often air-dried and packaged in small paper envelopes. Lichens and mosses can also preserve with their substrate such as stones and branches.
No matter the method of preservation, detailed information on where and when the plant was collected, habitat, color (since it may fade over time), and the name of collector is usually included.

A large herbarium may have hundreds of cases filled with specimens. Most herbaria utilize a standard system of organizing their specimens into herbarium cases. Specimen sheets are stacked in groups by the species to which they belong and placed into a large lightweight folder that is labeled on the bottom edge. Groups of species folders are then placed together into larger, heavier folders by genus. The genus folders are then sorted by taxonomic family according to the standard system selected for use by the herbarium and placed into herbarium cabinets.

Locating a specimen filed in the herbarium requires knowing the nomenclature and classification used by the herbarium. It also requires familiarity with possible name changes that have occurred since the specimen was collected, since the specimen may be filed under an older name. Modern herbaria often maintain electronic databases accessible via the Internet.

Herbaria are essential for the study of plant taxonomy, the study of geographic distributions, and the stabilizing of nomenclature. Thus it is desirable to include in a specimen as much of the plant as possible (e.g., flowers, stems, leaves, seed, and fruit).

Specimens housed in herbaria may be used to catalogue or identify the flora of an area. A large collection from a single area is used in writing a field guide or manual to aid in the identification of plants that grow there. With more specimens available, the author of the guide will better understand the variability of form in the plants and the natural distribution over which the plants grow (Bridson and Forman 1999).

Herbaria also preserve an historical record of change in vegetation over time. In some cases, plants become extinct in one area, or may become extinct altogether. In such cases, specimens preserved in a herbarium can represent the only record of the plant's original distribution. Environmental scientists make use of such data to track changes in climate and human impact.

Many kinds of scientists use herbaria to preserve voucher specimens; representative samples of plants used in a particular study to demonstrate precisely the source of their data. Herbaria are also a source of DNA banks. Most of the dried and well kept specimens can use for DNA studies.

A virtual herbarium is a web-based collection of digital images of preserved plants or plant parts. Each virtual specimen is accompanied by information on where and when it was collected, by whom, its correct botanical name, and often information on associated species and ecological preferences. At the present day, modern herbaria have a virtual herbarium. For instance Australia's Virtual Herbarium; the New York Botanical Garden, The C.V. Starr Virtual Herbarium; Utah Valley State College Virtual Herbarium; University of Connecticut Virtual Herbarium. There are also some preliminary works in Turkey: Van Virtual Herbarium.

Istanbul University, Science Faculty Herbarium

Istanbul University, Science Faculty Herbarium (ISTF) was instituted by German botanist Alfred Heilbronn in 1934. The international name of the Istanbul University, Science Faculty Herbarium was accepted as ISTF in 1956

by International Association for Plant Taxonomy, (IAPT). The invaluable collection of the herbarium is of course "Dead Sea" collection of the Ottoman Empire. The collection comprises 238 plant specimens. The specimens are kept in velvet boxes. Sultan's signature can also see on the boxes. ISTF keeps oldest collection among the other Turkish herbaria. It has over 40.000 plant specimens (Gülen et al. 2004).

Professional botanists always need to see herbarium specimens for revision studies, floristic works and morphological or anatomical purposes. Nowadays, herbaria are source of molecular taxonomy studies. So, botanists have to see and observe both old and new collections. It is not always possible to go outside for field studies because of weather conditions, finance.

Virtual Herbaria are perfect and the easiest way to obtain information about the specimens. You can see the image of the plant, condition of the specimen, identity number, collector, collection date, locality information. Also you can request for the loan. Of course, they are informative for botany students.

Materials and Methods

This application is written in PHP. It is a web work which abides MYSQL data base. The application deals out web server of Istanbul University, the server is Linux based apache web service.

Results and Discussion

There are two types of users in the application: "SuperUser" and "Data Entry Staff".The authorizations of these users can be define like this:

SuperUser

Management of "Data Entry Staff": SuperUser gives user names and passwords to the "Data Entry Staff" for recorded data of ISTF.

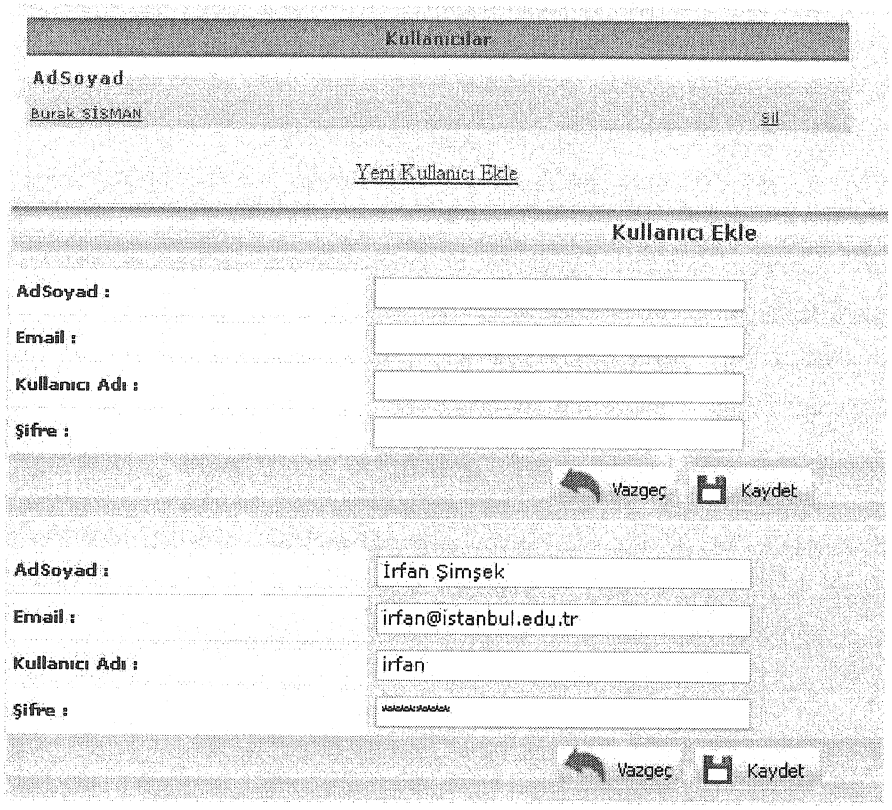


Figure 1. Data Entry Staff screen

Management of Family names: SuperUser creates the family names, orders or deletes.

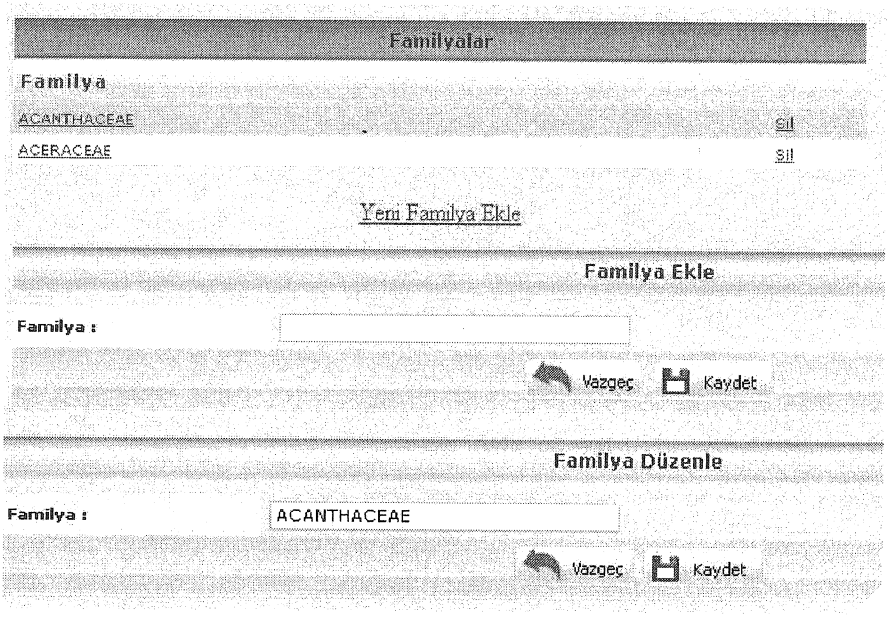


Figure 2. Family Names screen.

Province Data Management: Province names should be record in to the system for determining which plant specimen collected from which city.

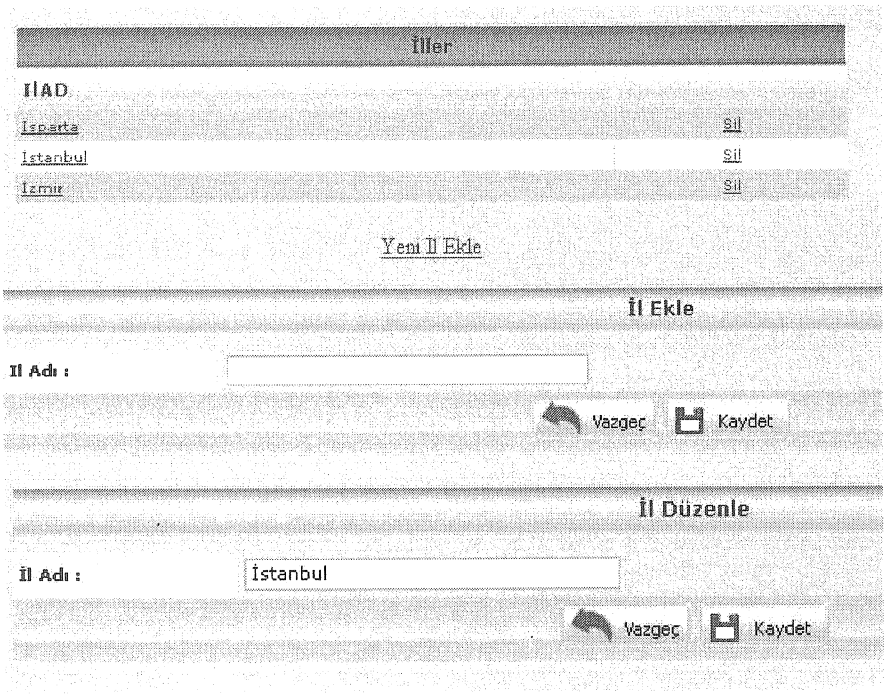


Figure 3. City Names screen

Management of Collector and Determinant Names: Super user creates the Collectors and Determinant names.

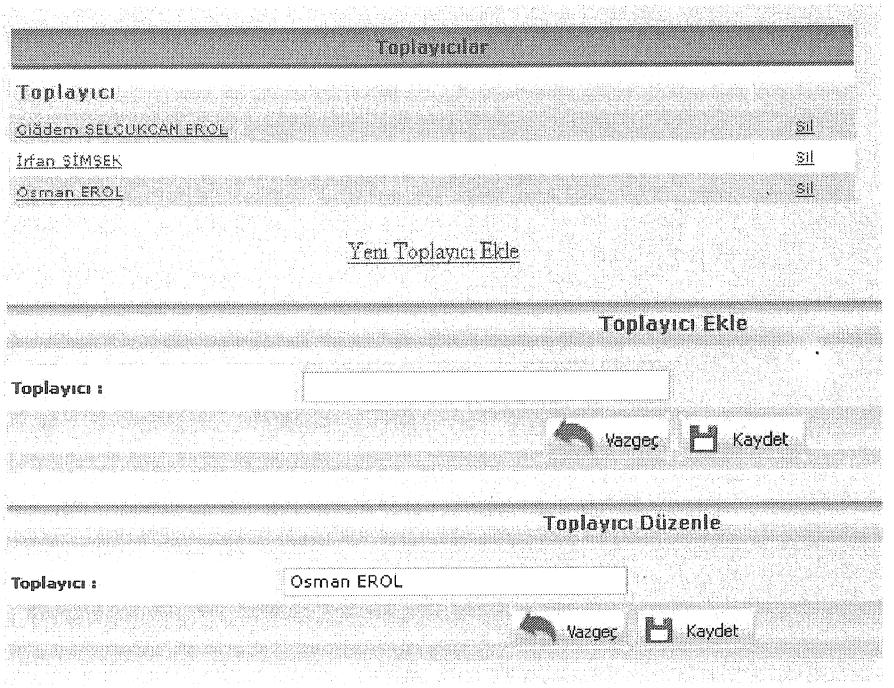


Figure 4. Collector Names screen

Management of Herbarium Records: SuperUser chooses the family name from the recorded data then writes in order the genus name, species name, subspecies name, variety name, the number of ISTF, Habitat knowledge, city (from the recorded data), district, altitude, coordinate, collector name(from the recorded data), determinant name(from the recorded data), date and note. Super user also corrects or deletes the data.



Figure 5. Herbarium Records screen

Receive Reports and Labels: It can be filter and access the recorded data of genera, provinces, ISTF numbers, collectors, determinants and families.

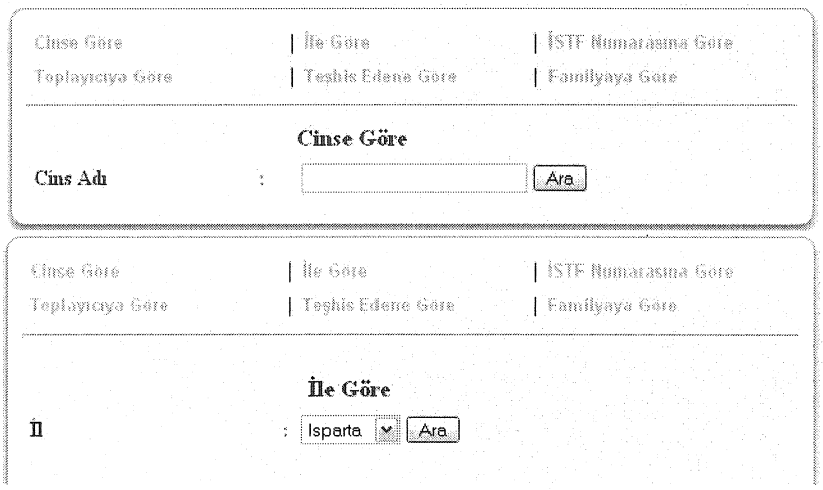


Figure 6. Report Screen

Data Entry Staff

Management of Family names: "Data Entry Staff" creates the family names, orders or deletes (Figure 2.).

Province Data Management: "Data Entry Staff" chooses the city name (Figure 3).

Management of Collector and Determinant Names: "Data Entry Staff" chooses the collectors and determinants from the recorded data (Figure 4).

Management of Herbarium Records: SuperUser chooses the family name from the recorded data then writes in order the genus name, species name, subspecies name, variety name, the number of ISTF, Habitat knowledge, city (from the recorded data), district, altitude, coordinate, collector name(from the recorded data), determinant name(from the recorded data), date and note. If there is, Data Entry Staff loads the photograph of the specimen (Figure 5.).

Receive Reports and Labels: It can be filter and access the recorded data of genera, provinces, ISTF numbers, collectors, determinants and families (Figure 6.).

Although the application can ease the certain jobs, there can also be some problems; the staff will spend a lot of time on computer and ISTF does not have full time staff. The data are entered by willing and some part-time student assistants. In these conditions, It will take up time to complete the work.

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