DATABASE DESIGN FOR SUPPORTING THE TECHNOLOGY OF SOME FIELD CROPS

PROIECTAREA BAZELOR DE DATE PRIVIND TEHNOLOGIA UNOR CULTURI DE CAMP

POP IOANA [1], LIANA STANCA[2], DAN VARBAN[1], FLORICA MATEI[1], RODICA VARBAN[1]
[1]University of Agricultural Sciences and Veterinary Medicine Cluj-Napoca
[2"]Babeş-Bolyai" University Cluj-Napoca

Abstract. *We want to propose in this paper an approach to the design of databases that could be used in advanced agricultural technologies. Nowadays, all these technologies are based on the usage of important volumes of data, organised in databases.*

Rezumat. *Articolul prezinta modul de proiectare corespunzator realizarii bazelor de date in domeniul tehnologiilor unor culturi de camp. In zilele noastre tehnologiile bazate pe un numar important de date se organizeaza in baze de date.*

A database represents a method of storing data on an external support, together with the possibility of retrieving it. The most frequently used database model is entity-relationship model, where data are stored in tables and tables are linked together by relations.

METHOD AND MATERIAL

The implementation of a relational database requires the design of the tables and then the definition of the relations between them. In the process of the table design, we must define the field names and the corresponding data types by which the designer controls what kind of data the user will be allowed to insert into the fields. A well designed database can provide access to updated data. A good and appropriate design is very important in order to reach the goals of the usage of that database.

The optimal design of the database requires the following steps to be respected:

- the identification of the objectives and the way the database will be used;
- the identification of the information that will be contained and the appropriate definition of the tables;
- the definition of the primary keys and unique keys, such that records can be uniquely retrieved;
- the definition of the foreigh or seconary keys and contraints;
- the configuration of the relations between tables;

- redundancy check and elimination;
- the definition of indexes that can speed up the selection operations

RESULTS AND DISCUSSIONS

So for an optimal design it is important to start from achieving a good knowledge about the purpose of the database, the way it will be used and who will be the users. This means among other things, to create and maintain a precise description of the purpose of the database, that will be used and changed if necessary, all along the design process.

Our database was created for storing information required for a succint description of the features of the main cultivated crops (cereals, bean vegetables, oleaginous plants, textile cultures, root crops and tubercular, tabacco, hops, medicinal plants).

During the database design we established the tables which will contain all the important data and characteristics of these crops:

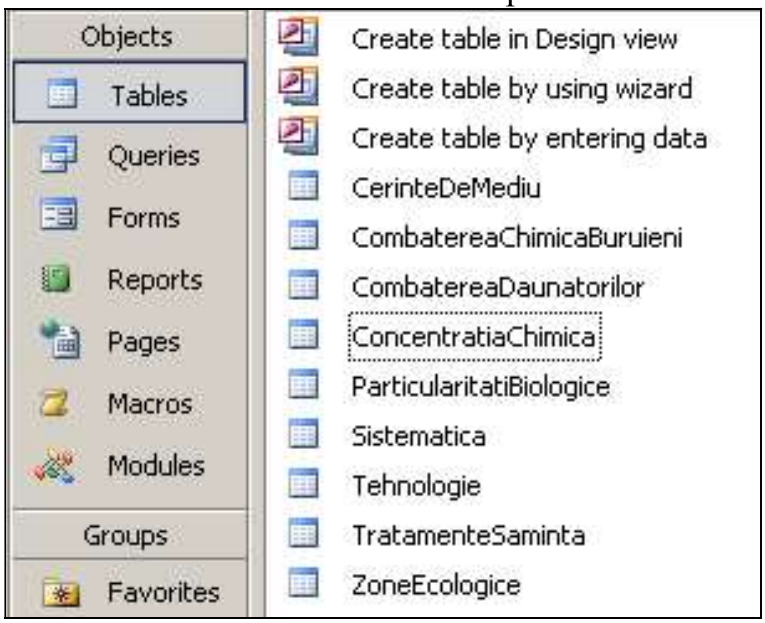


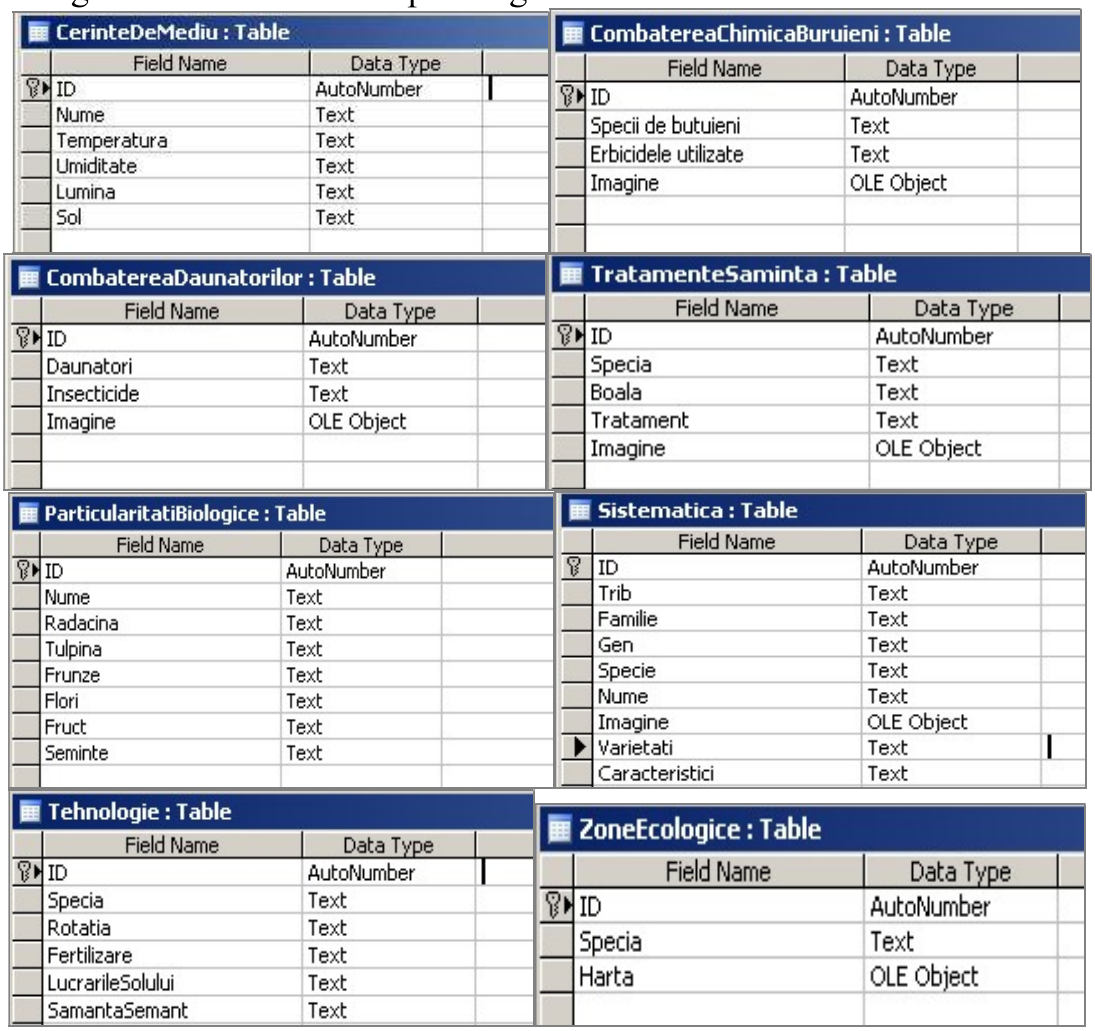
Fig.1 Tables of the Field Crops database

For a complex and complete characterization of each field crop, the issues are approached in this order:

- the importance of the crop;
- the chemical composition of the main product;
- systematical botanics(species, subspecies, varieties), origine, varieties and hybrids cultivated in Romania;
- biological particularities (morphology, vegetation phases);
- climate and soil requirements (ecology);
- culture technology: rotation (previous plants), fertilization (nutrition specifics, fertilizator doses, periods application), soil working, seeds and seeding (seeds quality, treatments against pathogens and diseases, periods, density and depth, seeding tehcniques), crops care (irrigation, pathogens, weeds, diseases and

other specific works), harvesting (optimal moment, methods and techniques) and yield per hectare.

So taking into account all the above mentioned aspects, we defined the following tables with the corresponding structures:



CerinteDeMediu : Table

Field Name	Data Type
ID	AutoNumber
Nume	Text
Temperatura	Text
Umiditate	Text
Lumina	Text
Sol	Text

CombatereaChimicaBuruieni : Table

Field Name	Data Type
ID	AutoNumber
Specii de butuieni	Text
Erbicidele utilizate	Text
Imagine	OLE Object

CombatereaDaunatorilor : Table

Field Name	Data Type
ID	AutoNumber
Daunatori	Text
Insecticide	Text
Imagine	OLE Object

TratamenteSaminta : Table

Field Name	Data Type
ID	AutoNumber
Specia	Text
Boala	Text
Tratament	Text
Imagine	OLE Object

ParticularitatiBiologice : Table

Field Name	Data Type
ID	AutoNumber
Nume	Text
Radacina	Text
Tulpina	Text
Frunze	Text
Flori	Text
Fruct	Text
Seminte	Text

Sistematica : Table

Field Name	Data Type
ID	AutoNumber
Trib	Text
Familie	Text
Gen	Text
Specie	Text
Nume	Text
Imagine	OLE Object
Varietati	Text
Caracteristici	Text

Tehnologie : Table

Field Name	Data Type
ID	AutoNumber
Specia	Text
Rotatia	Text
Fertilizare	Text
LucrarileSolului	Text
SamantaSemant	Text

ZoneEcologice : Table

Field Name	Data Type
ID	AutoNumber
Specia	Text
Harta	OLE Object

Fig. 2 Tables structure

We note that each table contains an ID field with the data type Autonumber which is the primary key. We used this field not for storing useful information, but only to define this unique key. The other fields are most of the of type Text because the data that will be edit inside are usually text. The fields containing images have the type OLE Object. When editing the tables containg image fields, in the corresponding column we will see the application software which created the image.

Forms are used to create the interface between the user and the tables. They allow an improvement of the way and feel and also of the usage, being a simpler but controlled gateway for the user for accessing and updating data in the database. The forms are based on the tables, and the changes done in the form content are updating automatically the tables on which their are based and reciprocally. Also, in the forms we will display the images that in the raw table view are displayed as file names.

Using a form for inserting and updating data have the following benefits:

- Forms allows to present the information as you want, with different field ordering, alignment and positioning.
- Forms can be defined to be similar to the paper document whose content will be inserted in the database. This made the data insert operation more easier and reduces the errors on the inserted data.
- We can design the forms to be user friendly, to focus on important data, indicating the required or facultative fields. It is not necessary that all the table fields to be present in the form.
- The form can contain validation rules on the inserted data, to control and limit incoerent or incorrect data input.

CONCLUSIONS

The present paper is the result of an interdisciplinary team work. Being a useful way for organizing data, the databases were used for storing in an structured manner the specialty information. We created also forms allowing the user to access this information. This way, the user receives the scientific and graphical information, optimising his research and documentation time.

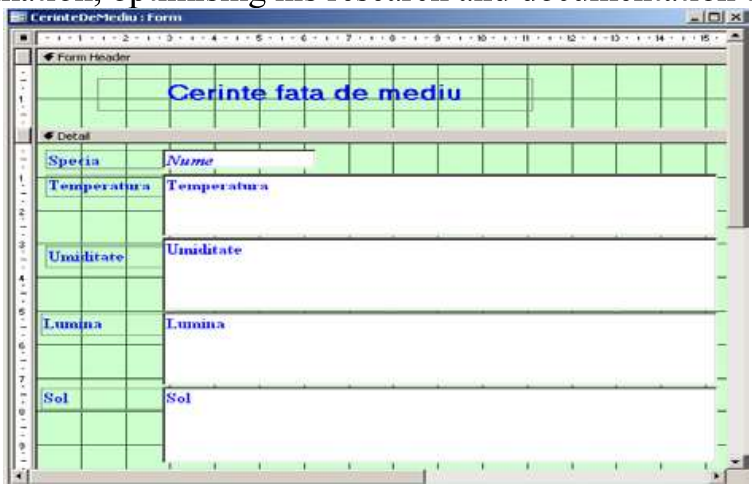


Fig. 3 Form "Cerințe față de mediu"

In the future we intend to develop a web interface for opening this database not only to more specialists that can improve the content, but also to other people that need to apply this information into practice.

REFERENCES

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