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Research Note

A Computerized Database for Freshwater Algae Recorded in Turkey*

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Abstract: A computer-based database for freshwater algae recorded in Turkey has been established. The first phase of the project involved the selecting of data types available for freshwater algal species occurring in Turkey. Such data were obtained from algal studies previously carried out in various freshwater bodies of the country. Data were then standardized in accordance with "The Central Database of Turkish Herbaria". The database program Access was used for entering data, as this program recognises Turkish characters. Algal data were entered into the database in the following order: division, class, order, family, genus, species, species author, subspecies, subspecies author, variety, variety author, province, and locality. More than 6000 pieces of data were loaded into the database.

Key Words: Freshwater algae, database, Turkey

Bilgisayar Destekli Türkiye Tatlısu Algleri Veritabanı

Özet: Türkiye'de kaydedilen tatlısu algleri için bilgisayar tabanlı bir veritabanı kurulmuştur. Projenin birinci aşamasında projede yer alan Türkiye'de şimdiye kadar yapılan çalışmalarda kaydedilmiş tatlısu algleri için veri tipleri belirlenmiştir. Veri tabanın ilk kuruluş aşamasında veriler "The Central Database of Turkish Herbaria" a uygun olarak standardize edilmiştir. Veri girişleri için Türkçe karakterlerin girilmesine imkan tanıyan "Access" veri tabanı programı kullanılmıştır. Algal veriler Divisio, Classis, Ordo, Familia, Genus, Species, Species Author, Subspecies, Subspecies Author, Variety, Variety Author, Province and Locality kategorilerine göre veritabanına girilmiştir. Veritabanına toplam 6000'in üzerinde kayıt yüklenmiştir.

Anahtar Sözcükler: Tatlısu algleri, veritabanı, Türkiye

Introduction

There are 3 approaches used for coding plants (Pignatti, 1976): ad hoc coding using a simple series of numbers or letters to establish a list of names, a closed system in which all the elements are conceived a priori, and an open system in which only general coding rules are established a priori. A continuous series of numbers corresponding to a master list of species was established in a botanical survey (Lloyd et al., 1972).

There are few systems that have been developed especially for numerical coding of algae. While making a computer analysis of the periphyton of 2 Swedish rivers, Klasvik (1974) used abbreviations for each half of a binomial, with 4 letters reserved for the genus and 3 for the species, e.g., *Chamaesiphon fuscus* was coded as CHAM FUS. A somewhat similar system for collating records of freshwater algae in British Columbia has been adopted (J.R. Stein, pers. comm.). Similar coding systems have been used widely in the ecological literature (e.g., Ceska & Roemer, 1971), although usually for relatively short lists of species. Nevertheless, systems based on letters lead to a variety of practical problems, such as those caused by synonymy and changes in nomenclature (Pignatti, 1976). Even with only 37 species, Klasvik (1974) faced the problem that 2 different binomials,

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Nitzschia palea and *N. paleacea*, would have the same abbreviation unless the coding convention was modified; the 2 species were, in fact, coded as NITZ PAL and NITZ PAA, respectively. A simplified version of this system for coding the more common freshwater algae of the British Isles has been published (Whitton et al., 1978) and an extension of the same system for other aquatic photosynthetic plants is provided by Holmes et al. (1979). A computer orientated numerical coding system for algae was introduced by Whitton et al. in 1979. They developed a system for coding freshwater algae numerically in a form suitable for recording and subsequent analysis of data with the use of a computer.

The number of projects and studies related to determining the biological diversity of Turkey has been increasing rapidly in recent years; however, these projects have been concerned mainly with establishment of databases for seed or flowering plants (Phanerogamae), and animals, whilst database projects related to spore-plants, including algae (Cryptogamae), have unfortunately been omitted.

The present paper summarizes the principles of the "The Turkish Freshwater Algae Database". It is quite clear that the present database for freshwater algae will be of great help in determining the biological diversity of Turkey. In addition, "The Turkish Freshwater Algae Database" also brings much information together on distributional and ecological characteristics of freshwater algae studied in various freshwater bodies of the country.

Materials and Methods

The first phase of the project involved the selection of data types available for freshwater algal species. These data were obtained from algal studies previously conducted in various freshwater bodies of Turkey. These data were then standardized in accordance with "The Central Database of Turkish Herbaria". Some data were entered into preliminary databases and, according to the results, the most suitable master database system was selected. The database program Access (Microsoft, Redmond, WA, USA) was used for data entry, as this program recognises Turkish characters. Access is a database management system that provides users with the software tools needed to organise data in a flexible manner. Access also includes features to add, modify, or delete data from the database. In addition, it asks questions (or queries) about the data stored in the database and produces reports summarizing the selected contents. The systematic of Prescott (1978) was used for the taxonomy of algae in the database.

Results

In total, 6130 pieces of data were installed in the database, which belonged to Bacillariophyta (3658 pieces of data), Charophyta (1 piece of data), Chlorophyta (1321 pieces of data), Chrysophyta (14 pieces of data), Cryptophyta (18 pieces of data), Cyanophyta (730 pieces of data), Dinophyta, (72 pieces of data), Euglenophyta (299 pieces of data), Prasinophyta (3 pieces of data), Rhodophyta (3 pieces of data), and Xanthophyta (11 pieces of data). Data were split into 2 major groups, diatoms and other algae, in order to enable users to find them rapidly when the database was in use. Separate data were entered for each locality in which the same algal species were recorded. Algal data were entered into the database in the following order: division, class, order, family, genus, species, species author, subspecies, subspecies author, variety, variety author, province, and locality. Abbreviations such as L (lake), DL (dam lake), R (river), and S (stream) were used to indicate the locality in which algal species was recorded. An example of algal data is given below, as installed in the "The Turkish Freshwater Algae Database" (Figure 1).

NUMBER	20
DIVISIO	Bacillariophyta
CLASSIS	Pennatibacillariophyceae
ORDO	Pennales
FAMILIA	Monoraphidineae
GENUS	Achnanthes
SPECIES	Achnanthes flexella
SP_AUTHOR	(Kütz.)Brun
SUB_SP	
SUBSP_AUT	
VARIETE	
VAR_AUT	
SYNONYM	
PROVINCE	Elazığ
LOKALITE	Cip DL

Figure 1. An example of algal data as installed in the "The Turkish Freshwater Algae Database".

"The Turkish Freshwater Algae Database" will be made available to users through internet by TÜBİTAK (The Scientific and Technological Research Council of Turkey). When the database goes online, users will be able to obtain information on algal taxon, its taxonomy, and the localities in which the alga was recorded quickly and easily with the click of a mouse button.

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