A data bank for Sardinian vegetation

V. SATTA, I. CAMARDA

Dipartimento di Botanica ed Ecologia Vegetale dell'Università di Sassari, Via Muroni 25 - 07100 Sassari

ABSTRACT. – In this paper a data bank of vegetation of Sardinia is given. This is a knowledge base of a GIS (System 9), within is possible to obtain any data or information about plant associations, réleves, their geographic distribution, references and several tools for vegetation analysis by appropriate software.

KEY WORDS – Plant associations, Sardinia, data bank, syntaxa, regional inventories.

INTRODUCTION

The need to have up-to-date inventories of plant associations is particularly felt by those who do research into vegetation. The considerable number of associations described and their respective syntaxonomic category, both for the various types of vegetation, and for greater or smaller geographical areas, can make it difficult to search for and read data. In any case, such data are useful above all at the moment when it is practicable to analyse them critically, which for various reasons is not always possible.

Regional inventories, when they concern limited land areas, which in many cases are not particularly complex, can be easier to use and manage.

A census of associations, carried out at the Department of Botany and Plant Ecology of the University of Sassari between 1991 and 1994, was considered as an indispensable preliminary step in the implementation of research into state forests in Sardinia.

Data obtained from bibliographical research was then entered into a data bank, in strict accordance with the syntaxonomic category suggested by individual authors. This enabled the setting up of an exhaustive compendium of associations already described for Sardinia up to 1993. In this case, 356 syntaxa were found to be present, comprising associations, sub-associations and plant communities. Among the various syntaxa 67 associations, 1 sub-alliance, 5 alliances, 3 orders and 1 class, turned out to be either endemic or completely new on the island.

The 356 syntaxa, which mainly refer to coastal and high mountain areas

of Sardinia, concern relatively small areas and omit a series of environments characteristic of plain and inland hilly areas (Camarda and Satta, 1995).

An example of the layout used for data presentation is shown in Table 1.

TABLE 1

EXAMPLIFICATED SCHEME OF DATA BANK

Carici-Genistetea lobelii (Klein 1972) Pign. et Nimis 1980, em. Arrig. 1986
Armerio sardoae-Geniston salzmannii Arrig. 1986
Helichryso-Genistetum salzmannii Gamis. (1975) 1977
Arrigoni P.V, 1986 - tab. 5; 5 ril.
Località: Area culminale del Gennargentu.

Carici-Genistetalia lobelii (Klein 1972) Pign. et Nimis 1980
Anthyllion hermanniae (Klein 1972) Gamis. 1977
Berberido-Genistetum lobelioidis trisetetosum Gamis. 1975
Arrigoni P.V, 1986 - tab. 2; 7 ril.
Località: Punta La Marmora-Su Sciusciu.

Genisto-Carlinetum macrocephalae Klein 1972
Pignatti E., Pignatti S., Nimis P., Avanzini A., 1980 - no tab.; ril. 34.
Località: Gennargentu.

Helichryso-Genistetum salzmanii Gamis. 1977 *jasionetosum montanae* Pign. et Nimis 1980
Pignatti E., Pignatti S., Nimis P., Avanzini A., 1980 - tab. 4; ril. 35-47.
Località: Gennargentu.

Thymo-Juniperetum nanae (Pign, Avanzini, Nimis 1977) Pign. et Nimis 1980
Pignatti E., Pignatti S., Nimis P., Avanzini A., 1980 - tab. 2; ril. 10-18
Arrigoni P.V., 1986 - tab. 3; 5 ril.
Località: Gennargentu; Area culminale del Gennargentu

Triseto-Genistetum corsiceae Gamisans 1977
Gamisans J. 1977 - tab. - ; ril.1-5.
Pignatti E., Pignatti S., Nimis P., Avanzini A., 1980 - tab 3; ril. 19-32.
Località: Gennargentu.

If research were extended to the whole region, a considerable increase in associations and data connected to them is foreseeable. For this reason, future data management, even for quite small-sized regional environments, could become complex and laborious. In any case, it is indispensable to have a computing tool which is flexible and easy to use, with different user interfaces according to the specific requirements of the researcher.

THE DATA BANK AND INFORMATION SYSTEM

The data bank aims to store information within an organised framework, in order to facilitate research into the various descriptive and hierarchical aspects connected with an association and its geographical location. In such a way it is possible to compare and process data in terms of specific requirements.

The information system was designed to a format with references as in figure 1, with a series of windows with one or more fields, which refer to the association, sub-association, synonym, class, order, alliance, characteristic and differential species, ecology, holosyntypus, bibliographical references, any tables or readings which exist, and any notes to be attached. Furthermore, the database was correlated with a GIS, a land information system, which enables simple and instantaneous access to data according to the locality or geographical coordinates requested, and the automatic creation of associations maps as required.

Immediate evaluation of data and the need for vital and opportune critical reviews, which may arise spontaneously while certain procedures are being carried out, are thereby possible. In the case of juniper woodland with *Juniperus phoenicea* (table 2), it may be observed that the syntaxa tend to outnumber the species of which they form a part; other logical inconsistencies,

TABLE 2

PLANT COMMUNITIES WITH *JUNIPERUS PHOENICEA* L. s.l.

1. Chamaeropo-Juniperetum phoeniceae De Marco, Dinelli, Caneva 1989 juniperetosum macrocarpae De Marco, Dinelli, Caneva 1989
2. Chamaeropo-Juniperetum phoeniceae De Marco, Dinelli, Caneva 1989
3. Chamaeropo-Juniperetum phoeniceae De Marco, Dinelli, Caneva 1989 euphorbietosum dendroidis De Marco, Dinelli, Caneva 1989
4. Chamaeropo-Juniperetum phoeniceae De Marco, Dinelli, Caneva 1989 helicrysetosum (italici) De Marco, Dinelli, Caneva 1989
5. Chamaeropo-Juniperetum phoeniceae De Marco, Dinelli, Caneva 1989 quercetosum De Marco, Dinelli, Caneva 1989
6. Erico-Juniperetum phoeniceae De Marco, Dinelli, Caneva 1989
7. Erico-Juniperetum phoeniceae De Marco, Dinelli, Caneva 1989 euphorbietosum dendroidis De Marco, Dinelli, Caneva 1989
8. Erico-Juniperetum phoeniceae De Marco, Dinelli, Caneva 1989 helichrysetosum italici De Marco, Dinelli, Caneva 1989
9. Erico-Juniperetum phoeniceae De Marco, Dinelli, Caneva 1989 juniperetosum macrocarpae De Marco, Dinelli, Caneva 1989
10. Erico-Juniperetum phoeniceae De Marco, Dinelli, Caneva 1989 quercetosum De Marco, Dinelli, Caneva 1989
11. Oleo-Juniperetum phoeniceae Arrigoni, Bruno, De Marco et Veri 1975 chamaeropetosum Caneva, De Marco et Mossa 1981
12. Oleo-Juniperetum phoeniceae Arrigoni, Bruno, De Marco et Veri 1990
13. Oleo-Juniperetum phoeniceae Arrigoni, Bruno, De Marco et Veri 1990 ex De Marco, Dinelli, Caneva 1989 (!?)
14. Oleo-Juniperetum phoeniceae Arrigoni, Bruno, De Marco et Veri 1990 ex De Marco, Dinelli, Caneva 1989 (!?) euphorbietosum dendroidis De Marco, Dinelli, Caneva 1989 (!?)
15. Oleo-Juniperetum phoeniceae Arrigoni, Bruno, De Marco et Veri 1990 ex De Marco, Dinelli, Caneva 1989 (!?) helichrysetosum italici De Marco, Dinelli, Caneva 1989
16. Oleo-Juniperetum phoeniceae Arrigoni, Bruno, De Marco et Veri 1990 ex De Marco, Dinelli, Caneva 1989 (!?) juniperetosum macrocarpae De Marco, Dinelli, Caneva 1989 (!?)
17. Oleo-Juniperetum phoeniceae Arrigoni, Bruno, De Marco et Veri 1990 ex De Marco, Dinelli, Caneva 1989 (!?) quercetosum De Marco, Dinelli, Caneva 1989 (!?)
18. Oleo-Juniperetum turbinatae Arrigoni, Bruno, De Marco et Veri 1990, corr. Biondi et Mossa 1992
19. Phillyreo angustifoliae-Juniperetum turbinatae Arrigoni, Nardi et Raffaelli 1985, corr. Biondi et Mossa 1992

Associazione	Astragalo-Armerietum pungentis Filigheddu et Valsecchi 1989
Subassociazione	
Classe	Helychryso-Crucianelletea Géhu, Riv.-Mart. et Tuxen 1973 em. Siss. 1974
Ordine	Helychryso-Crucianelletalia Géhu, Riv.-Mart. et Tuxen 1973 in Géhu 1975
Alleanza	Crucianellion maritimae Rivas-Goday, Riv.-Mart. 1973
Specie caratteristiche	Armeria pungens, Astragalus massiliensis
Ecologia	Zone retrodunali pianeggianti
Holosyntypus	(32) Filigheddu R., Valsecchi F., 1989: 32-1-1
Bibliografia	(32) Filigheddu R., Valsecchi F., 1989 - tab. 1; ril. 1-3 (8).
Località	Badesi, Lu Bagnu, Rena Majore, SanPietro a mare, Stazzi Silvara.
Note	...Il ruolo di Armeria pungens, Helichrysum microphyllum, Scrophularia ramosissima e Crucianella maritima viene ampiamente trattato in relazione alle diverse facies della vegetazione litoranea psammofila. Dalle tabelle presentate si evince la difficoltà di poter discriminare in modo chiaro sia le associazioni che le diverse sottoassociazioni descritte. Nella sottoassociazione Scrophulario-Crucianelletum maritimae teucrietosum capitati gli autori evidenziano...

Fig. 1 - Structure of data bank

which are due to various reasons, are highlighed in the list and are indicated with the symbol (!?).

The structure, as exemplified on the screen in figure 1, takes a dual approach to data analysis, going from the particular to the general and vice versa.

By calling up the name of an association it is thus possible to view all the data connected with it; at the same time, from any piece of structured information, it is possible to automatically call up all the fields which are connected to it. For example, if "Rena Majore" is called up from the locality field it is possible to view all the associations which have been recorded in a particular place. In the same way, in the ecology field, by entering "Flat continental-side dune areas" it is possible to work up through all the associations present in the whole of Sardinia.

This is due to the fact that each field is linked to a series of files which contain separate lists of all associations, all classes, all characteristic species etc.

The field which contains specific and particular notes concerning an association data is the only one from which it is not possible to carry out an information search from within the database. It is, however, of vital importance as it provides a series of data which cannot be accessed from the other fields.

The data bank was set up using "Empress 32", a relational database programme, which facilitates the searching for, selection and gathering of data by using predetermined criteria. To make it easier to use the data a simplified version and a partial data series are available, which can be run on commonly used software.

Conclusions

It is possible to implement this data bank with a great quantities of data referable to wider regions, maintaining, at the same time, the functionality of the data base.

However, inventories concerning limited phytogeographical areas, can be easily to used to manage and arise the powerfull of the system.

REFERENCES

CAMARDA I., SATTA V., 1995 – *Compendio delle associazioni vegetali della Sardegna.* XI Giornata dell'Ambiente Convegno sul tema: La Vegetazione italiana (Roma 5 giugno 1993). Atti Acc. Naz. Lincei, **115:** 307-360.

DE MARCO G., DINELLI A., CANEVA G., 1985 – *Analisi sintassonomica e fitogeografica comparata della boscaglia a Juniperus phoenicea* L. *in Sardegna.* Not. Fitosoc., **22:** 39-48. Atti Coll. Intern. su "Problematiche geografiche e tassonomiche della classe Quercetea ilicis", Cagliari, 1985.

BIONDI E., MOSSA L., 1992 – *Studio fitosociologico del promontorio di Capo S. Elia e dei colli di Cagliari*. Doc. phytosoc., **14:** 1-44.

FILIGHEDDU R., VALSECCHI F., 1989 – *Osservazioni su alcune associazioni psammofile nella Sardegna settentrionale*. Coll. Phytosoc., **19:** 159-181.