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Aquabank. A data base for the Greek aquaculture

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SUMMARY - The support and the further development of the aquaculture branch require proper management. For this reason information concerning biological, environmental and socio - economic data is needed. AQUABANK, a database with information concerning the state of development of the Greek aquaculture is operational since March 1994. The main data base, located in Iraklion, is available on-line. Also a microcomputer based system exists containing summary information. The information system is based on Client/Server technology. The initial data was collected from 75 farms (covering almost 60% of the total national production being of all different types: vertical integrated, on-growing, big or small). The further data collection has taken place on a regular base from 10 selected farms according to their geographical distribution and type. The available information includes environmental parameters (T, O_2, etc.), and also data about the biological performance of the reared population (growth rate according to the season, pathological problems, rearing technologies, etc.). AQUABANK, in relation with other databases containing socio-economic data (production statistics, legislation aspects, etc.), constitutes an important tool for aquaculture management.

Key words: Aquabank, database, aquaculture, Greece.

RESUME *- Le développement de l'aquaculture nécessite des outils de gestion. Pour cette raison toute information relative aux données biologiques, écologiques et socio-économiques est importante. "AQUABANK" est une base de données sur l'état de développement de l'aquaculture grecque, opérationnelle depuis Mars 1994. La banque de données principale, située à Iraklion, est accessible on-line, et un résumé de l'information principale est disponible sur disquette micro-ordinateur. Le système d'information est basé sur la technologie "Client/Server". Les données initiales proviennent de 75 fermes (représentant au moins 60% de la production nationale et différents types de systèmes de production: verticaux intégrés, grossissement, grandes ou petites entreprises). La collecte ultérieure de données a été réalisée sur 10 fermes sélectionnées pour leur distribution géographique et leur structure de fonctionnement. L'information collectée inclut des paramètres d'environnement (T, O_2, etc) ainsi que des données biologiques sur les performances des populations élevées (rythmes de croissance en fonction de la saison, problèmes pathologiques, technologies d'élevage, etc). "AQUABANK" en relation avec d'autres banques de données contenant des données socio-économiques (statistiques de production, aspects législatifs, etc) constitue un outil important pour la gestion de l'aquaculture.*

Mots-clés : *Aquabanque, base de données, aquaculture, Grèce.*

INTRODUCTION

Aquaculture is a potential branch of Greek and also Mediterranean economy having a great expansion the last years. One important problem that aquaculture faces is the reduced market prices with a parallel marginal production cost. Therefore, the support and the further development of the aquaculture branch require proper management of each farm separately but also of an area, a country or even a region. For this reason information concerning biological, environmental and socio - economical data is needed. This information can be used direct or indirect by the farmers for the improvement of the rearing process and also by associations or public services for the realisation of a central strategy for support and development of the aquaculture. The direct needs are concerning mainly factors like the environmental parameters (T, O_2, etc.), that affect the biological performance of the reared population, and also the distribution of pathological problems in an area, which gives the possibility of predicting a probable problem and thus either to avoid, or to get prepared for it. Indirect use of this information is related to the decision for the location of a new enterprise, the protection of an already existed, the marketing, etc.

AQUABANK partially covers the above needs. It is the first national try for a systematic collection of information in the field of aquaculture in Greece.

SYSTEM DESIGN AND IMPLEMENTATION

The project AQUABANK is operational since March 1994. It was financed by STRIDE programme, and the implementation was carried out in collaboration with the Institute of Applied and Computational Mathematics in Crete. The available information is concerning the state of development of the Greek aquaculture. The information system is developed in two parts. The main data base located in Iraklion that is available on-line, and a microcomputer based system containing summary information.

The design and the implementation of the main information system are based on Client/Server technology. The benefit of this technology is that the server searches the database and gives the information to the client. The client is responsible for the data forming and displays the data according to the user needs.

The server is based on a relational data base (ORACLE version 7) and runs on a RISC workstation under UNIX operating system (HP 9000/720).

The client is developed with the Visual C++ Version 1.5 and runs under the environment of Microsoft Windows 3.1 following the principles of the Graphics User Interface (GUI's).

The connection of the Client/Server can be established via a local Ethernet network or packet switched data network HellasPAC (X.28) or public telephone system. For this purpose special routines have been developed, using the Visual C++, activated on data transferring, without the need of any special communication program (like Procomm, SmartTerm, etc.). The user can change the communication parameters (serial port, Baud rate, parity, data bits, stop bits) and the password through friendly menus.

The microcomputer based information system, ought to be friendly and easy of access, has been developed under Microsoft Windows using the principles of the Graphics User Interface through the Visual C++. It is based on the data of the main

system. For the formation of the tables and graphics, special programming packs were used (the Visual Control Pack of Microsoft and the Spead 2.0 of Power Point). For the display of gathered information, digital maps were also created using GIS software (pc ArcInfo version 3.4D of Environmental Systems Research Institute). For the implementation of the system C++ was used instead of DBMS, so the user is not needed to have the run time version of the DBMSystem.

DATA COLLECTION

The initial data was collected with questionnaires, specially designed for this purpose, which have been sent to farmers after informing them for the purpose of the project, and also with personal interviews from specialised personnel. 75 farms covering almost 60% of the total national production and all different types (vertical integrated, on-growing, big or small) were represented on this first data collection. Also the geographical distribution of the farms was representative of the total. The check of the data was done in two ways:

a. through the questionnaire itself with cross check evaluation of the data, and

b. by the local check at the farms.

Another part of the information exist in the database was retrieved at the institute from row data that the producer provided.

The further data collection is take place on regular base (4-5 months) from 10 farms selected from the accuracy of the data they have provided the structure and the size and also from the geographical location.

AVAILABLE INFORMATION

Through the network the information is available to anyone interested. The system supply information about the total number of farms and for each farm separately.

In the first case, gathered information is available in table or graphic format, expressed either in absolute numbers or in percentages, and also with the help of maps. The information is about the location and the type of farm (Fig. 1) the physicochemical parameters, technological aspects like type of cages (Fig. 2), elements of zootechnic specially for the vertical integrated farms and also about the appearance of pathological problems and their seasonal and geographical distribution (Fig. 3). It is also possible retrieval of secondary information like the growth rate of the reared fish according to the location and the season (Fig. 4) of the rearing as well as the time for reaching the marketable size according to the location of the farm (Fig. 5).

In the second case, the information concerns the special characteristics of the farm (structure, location, depths, currents, physicochemical parameters, capabilities, species reared, etc.).

The group of enterprises for which information is given and the data of which are used for the retrieval of the secondary information, is defined (through menu) by the user with the use of Criteria according to characteristics of the farm (location, structure, species reared, rearing starting period, etc.).

The users, devised in three categories, have different access privileges.

Help is also available on-line.

The microcomputer based information system provides gathered information and gives an overall picture of the present situation of the Greek aquaculture. (Fig. 6) The system is available to everybody and will be renewed every year with new data arising from the main system.

FUTURE PERSPECTIVES

The realisation of the database, in relation with the experience of the aquaculture department of I.M.B.C., gives the possibility of supplying consultative services to the farmers. The initial scepticism of the producers has already overcome and specialised personnel of the department advice on subjects concerning the rearing methods from the biological and economical point of view, and also about pathological problems and methods of curing them.

From the experience gained in Greece, it is clear the need of further development of a system of collecting, processing and distributing information. Aquaculture management requires combined information from biological, environmental, and also socio-economical data. The biological data should include the growth performance of the reared population in an area, distribution of pathological problems and curative methods, technological aspects of the rearing process, etc. The environmental data should concern the physicochemical parameters (T, O2, currents, waves, etc.) and also data of migrations of marine organisms. The socio-economical data should refer to laws and regulations, location of other farms and also other coastal activities, suppliers of aquaculture equipment, production statistics, market prices, transportation methods, and also information about the labour market. The integration of these components for Greece and if possible for the Mediterranean will help not only for the aquaculture management, but also for the supply of consultative services and for long distance training of the farmers, with the use of new technologies. It is needed thus a main system for the management of these spatial databases for the support and also the further improvement of the aquaculture branch.

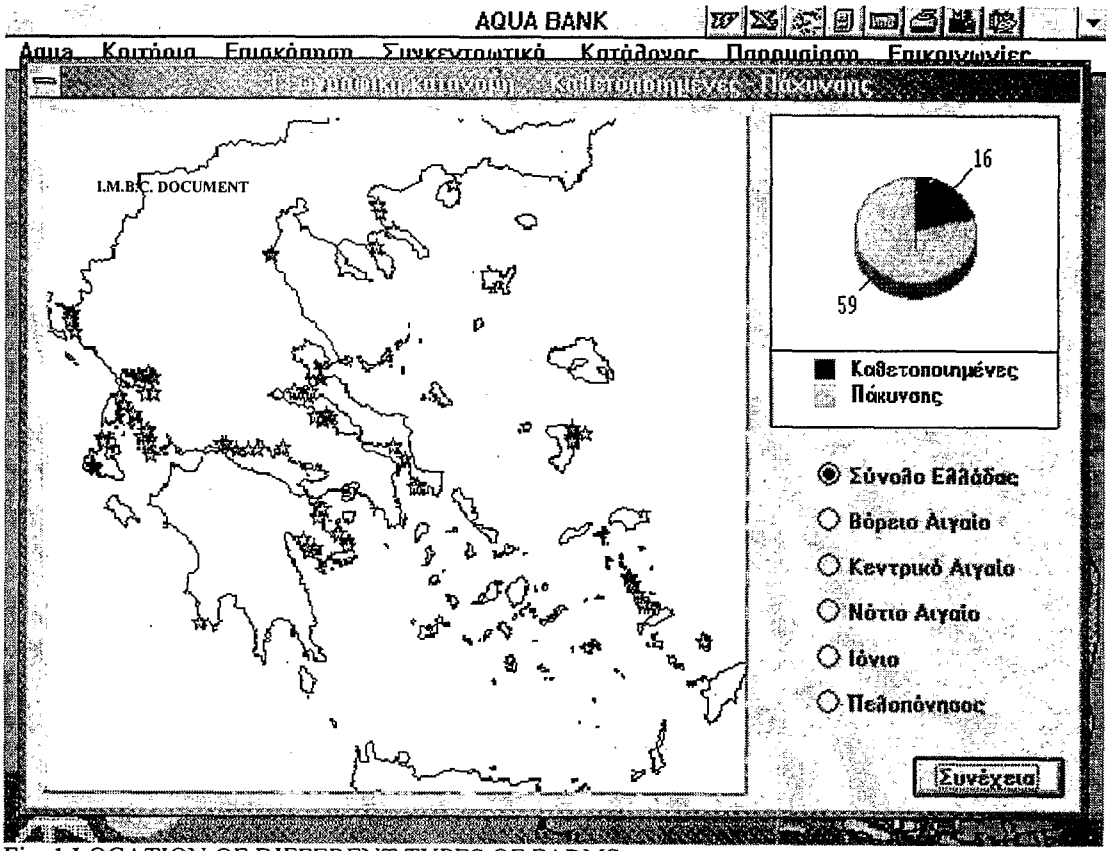

Fig. 1 LOCATION OF DIFFERENT TYPES OF FARMS
(VERTICAL INTEGRATED - ON GROWING)

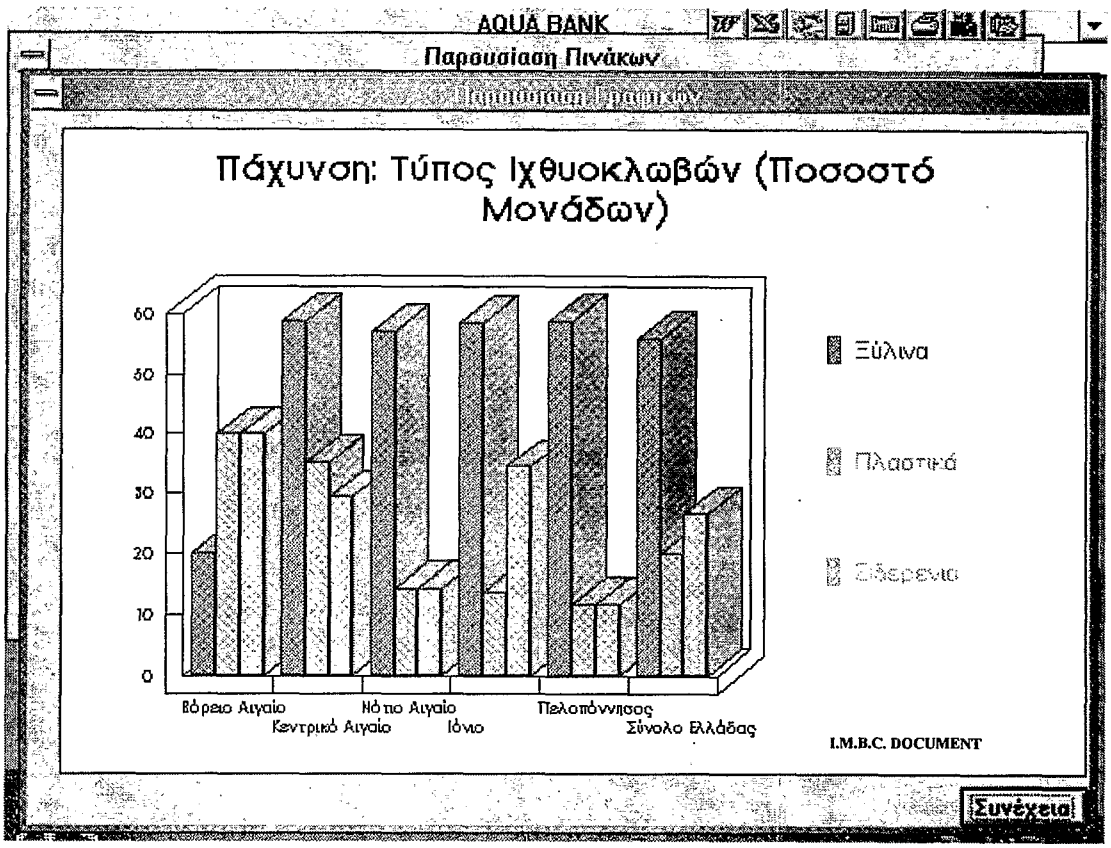

Fig. 2 TYPE OF CAGES (WOODEN, PLASTIC, METALLIC)

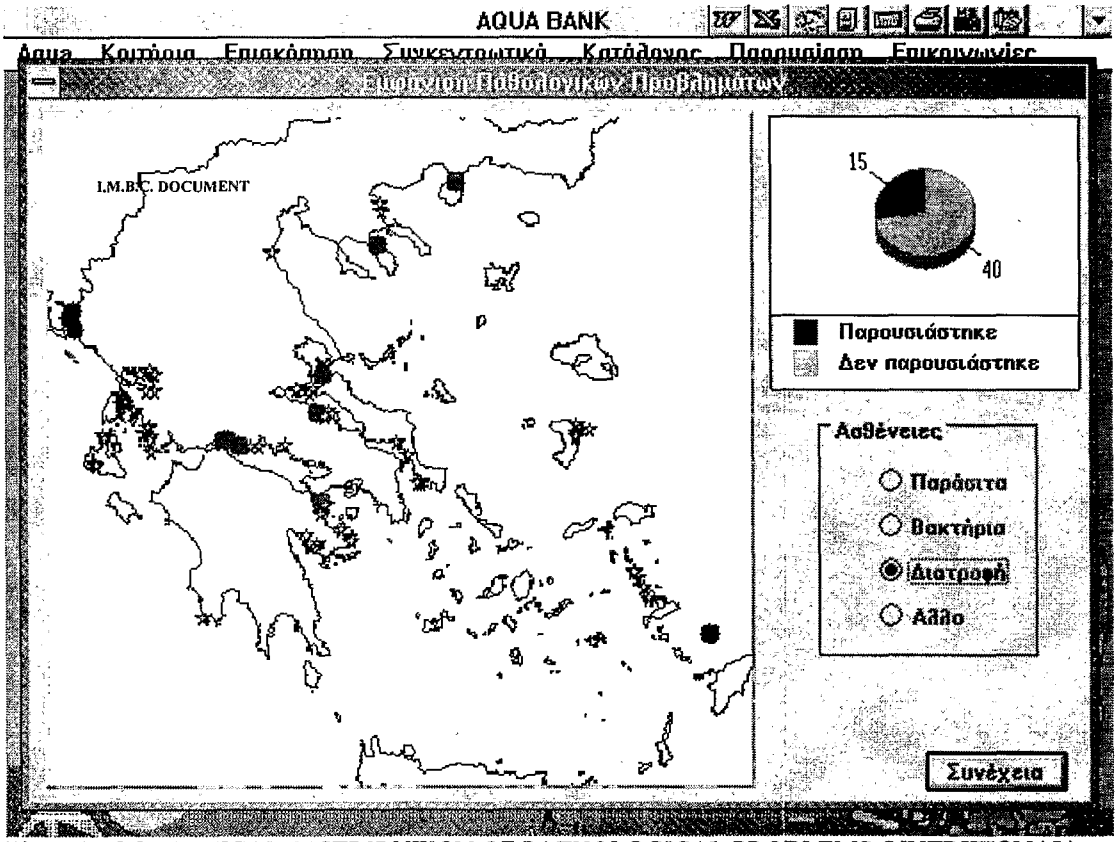

Fig. 3 GEOGRAPHICAL DISTRIBUTION OF PATHOLOGICAL PROBLEMS (NUTRITIONAL)

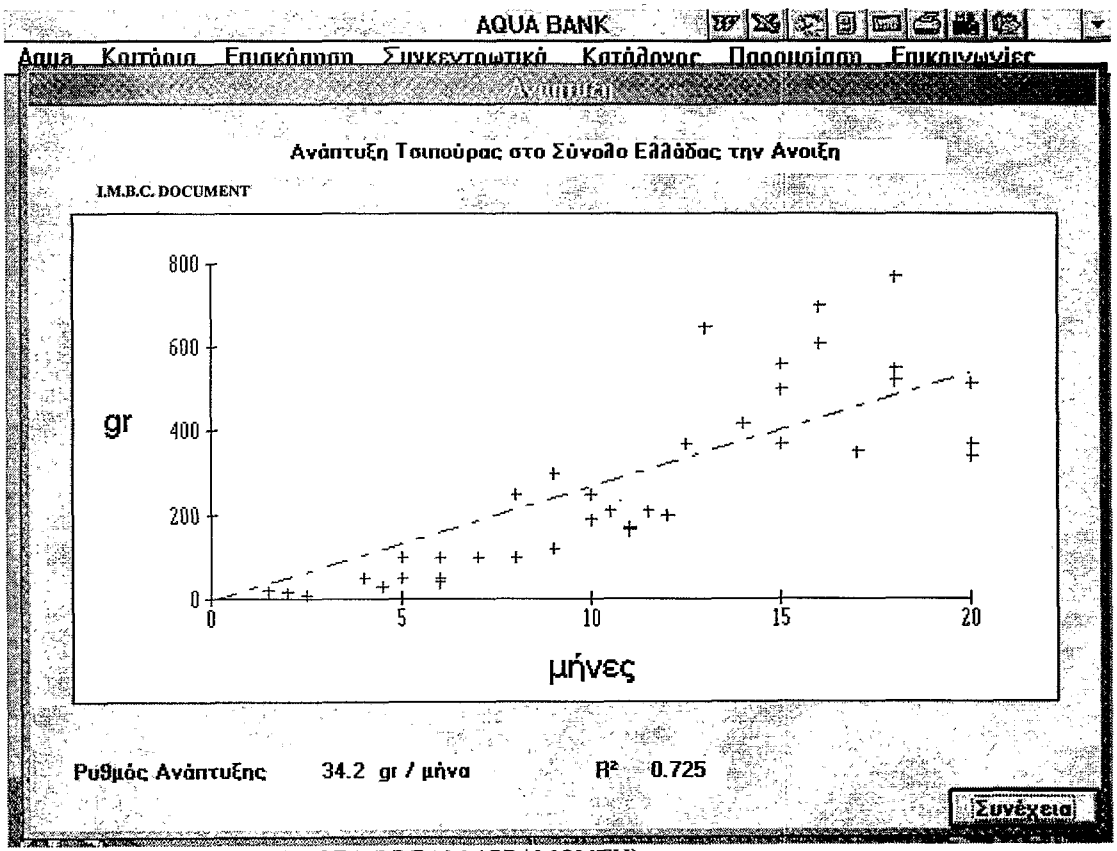

Fig. 4 GROWTH RATE OF SEA BREAM (GR/ MONTH)

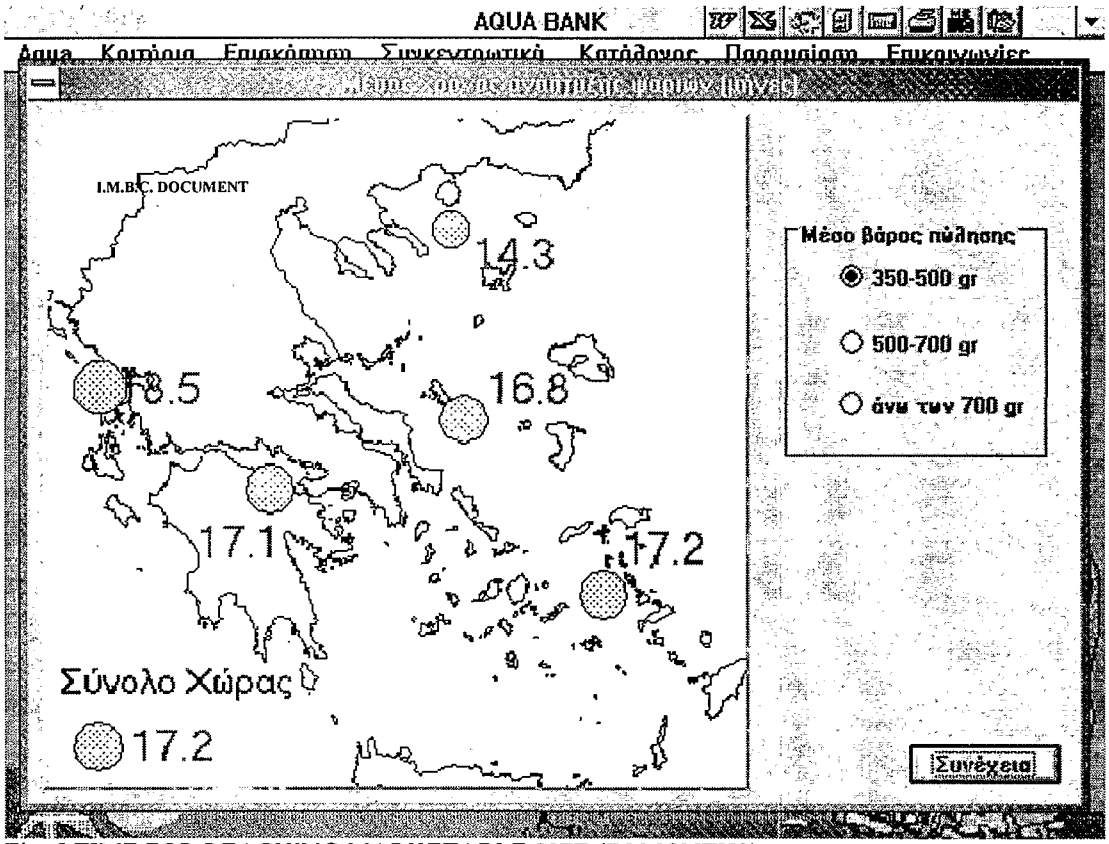

Fig. 5 TIME FOR REACHING MARKETABLE SIZE (IN MONTHS)

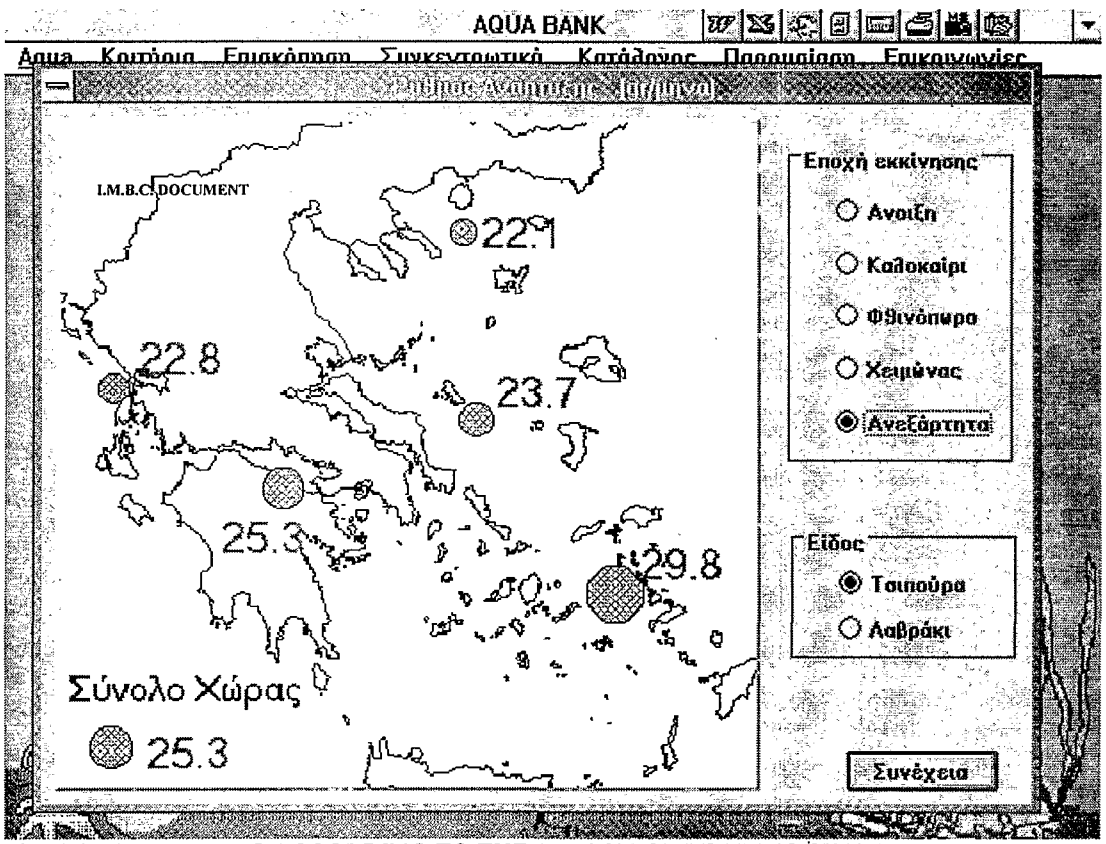

Fig. 6 GROWTH RATE ACCORDING TO THE SEASON OF REARING START