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Journal of Chemical and Pharmaceutical Research, 2013, 5(11):80-83

Research Article

ISSN : 0975-7384
CODEN(USA) : JCPRC5

Microorganism information share and exchange on a web-based agricultural information service system

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ABSTRACT

At present, the extent of agricultural information share and exchange is low, especially between different departments or applications where most information resources are separated, scattered and immethodical. In order to integrate agricultural information resources and realize the share and exchange of agricultural information resources, the construction of an agricultural information service system is an effective way. In the paper, combined with the current situation of agricultural informationization construction in China, how to construct the agricultural microorganism information service system is discussed to realize the share and exchange of agricultural information. In order to express various agricultural information, an Agricultural Information Markup Language (AIML) is design that is an XML-based special language for describing agricultural information resources. The system improves the scope and extent of information share and operation coordination by providing common supporting service for operation systems, such as, information exchange service, information security service, etc. Consequently, the whole efficiency of agricultural informationization is enhanced.

Keywords: Microorganism, Agricultural information, Sharing and exchange, XML, Information service.

INTRODUCTION

In recent years, agricultural informationization construction has developed quickly [1]. It is widely used in public service, market supervision, decision-making support, etc. Agricultural information share and exchange makes the best of information resources. At present, the extent of agricultural information share and exchange is still low, especially between different departments or applications where most information resources are separated, scattered and immethodical. This makes it hard to share and exchange information conveniently and effectively. If the information resources are standardized, collected, integrated and managed to form a mutually associated integrated information resources system, they will play a more important role in agricultural operation management and decision-making. The main technologies used to share and exchange information resources are metadata, XML, data warehouse, middleware, network, SOA, etc [2,3].

Because of the information decentralization of microorganism agriculture, it is difficult to collect and take the full advantage of the microorganism information. In the paper, in order to provide an information share and exchange platform for microorganism agriculture scientific and technical personnel, the construction of an agricultural microorganism information service system is presented to realize the logical management of distributed heterogeneous information resources of applications in each agricultural department [4]. Thereby, each department can know the basic status of information resources in time, find the information resources needed, and exchange information with other departments and systems. Furthermore, the new deepening application based on information share and exchange on the system can realize the maximal increment of information resources.

AGRICULTURAL MICROORGANISM INFORMATION SERVICE SYSTEM

The share and exchange procedure of agricultural information service system is divided into three components, i.e., data supply, data transmission and data consumption. At the data supply end, the data are extracted from the operation systems that hold basic metadata. The extracted data are processed and then transmitted to the appointed data consumption end. The data are transmitted on local area networks and Internet. At the data consumption end, after the data are received, the data are processed and reverted into the basic metadata. The metadata are then stored into a database or displayed on a user interface according to practical demand.

The data shared and exchanged on the agricultural information service system are classified and described by adopting common criteria and rules. They are expressed with XML to eliminate the diversity between application scopes, construction modes, system structures, information resources, and so on. Thus, the simple and reliable share and exchange of agricultural information can be achieved.

Three-layered distributed structure (Web Browser/Web Server/Database System) is adopted in designing the agricultural information service system, as shown in Fig. 1. Web browser at the user layer provides various user interfaces. It must be easy to use so that the user is able to find and make use of the needed information expediently. Web server at the application layer is called middleware. All applications, applied logic and control mechanism are at this layer that incarnates the complicacy of the agricultural information service system. Database system at the database layer stores a great quantity of information. The functions of the agricultural information service system are shown in Fig. 2.

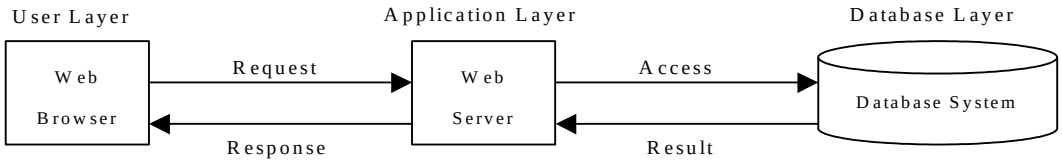

Fig. 1. Three-layered distributed structure of agricultural information service system

DESIGN OF AGRICULTURE INFORMATION MARKUP LANGUAGE

With the rapid development of XML technology, it has become a standard for information representation and exchange. In actual applications, the agricultural information integration based on XML is to provide an interface between the inner systems and the exterior systems of the agricultural functional departments.

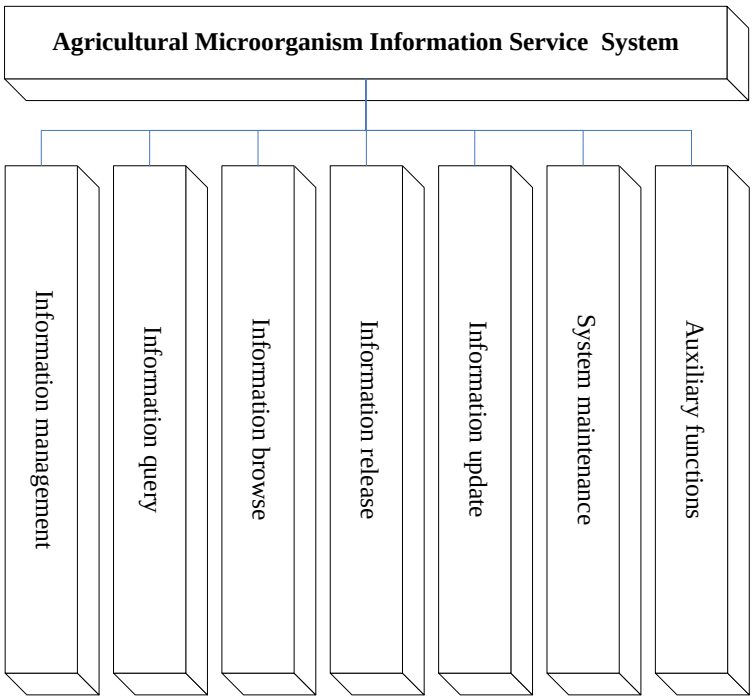

Fig. 2. The functions of the agricultural information service system

In the process of designing the agricultural information service system, the design of Agricultural Information Markup Language (AIML) is put forward that is a normative markup language used to describe agricultural information. After analyzing the classification and construction of agricultural information [5], AIML is devised based on XML. Then, it is used in the establishment of agricultural information database. AIML is a kind of language based on XML that can be used to describe agricultural information well and truly. The establishment of DTD of AIML puts forward a criterion for describing agricultural information. In the future, utilizing the extensibility of XML, more marks can be added to AIML to describe pictures, videos and so on. Thus, agricultural information can be expressed more intuitionistically and roundly. The definition of some tags of AIML for Installation Agriculture technology is listed in Table 1.

According to the scope and industrial classification of microorganism agriculture, the information concerning microorganism fertilizer, microorganism feed, microorganism pesticide, microorganism food, microorganism energy and so on are included in the system, as shown in Fig. 3.

Table 1. The definition of some tags of AIML for Installation Agriculture technology

Name	Meaning
<installations></installations>	Root mark
<shed></shed>	Shed technology
<greenhouse></greenhouse>	Greenhouse technology
<name></name>	Name
<main_structure></main_structure>	Main structure
<covering_material></covering_material>	Covering material
<ventilation></ventilation>	Ventilation
<specification></specification>	Specification
<capability_index></capability_index	Capability index
<configuration></configuration>	Configuration
< manufacturer ></ manufacturer >	Manufacturer
… …	… …

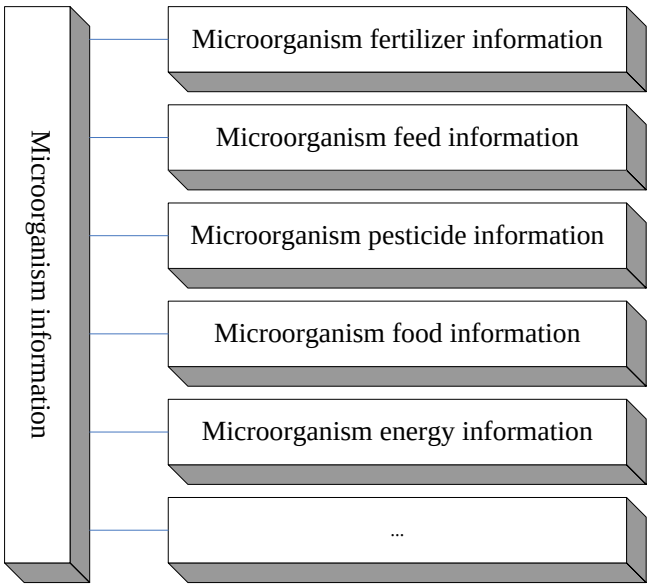

Fig. 3. The microorganism information involved in the system

CONCLUSION

The agricultural microorganism information service system integrates the separated applications and information resources to realize the effective management of various kinds of agricultural microorganism information and share and exchange of agricultural information. The system improves the scope and extent of information share and operation coordination by providing common supporting service for operation systems, such as, information exchange service, information security service, etc. Consequently, the whole efficiency of agricultural informationization is enhanced. But there are still some problems to be solved in the application of the system. For example, some information resource units are not willing to provide some information because of various reasons. This needs to be deal with by the coordination of multiple parties. In addition, there exists timely share problem of

agricultural information. All these need the construction of effective management mechanism of information share and service.

Acknowledgment
The paper is supported by Special Scientific Research Project of Shaanxi 13115 Scientific and Technological Innovation Engineering Project (2010FWPT-05), Shaanxi Provincial Department of Education (09JK475) and Shaanxi Major Subject Construction Project.

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