

Internet Application for Mushroom Research and Development

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ABSTRACT

Internet is a global storehouse of information. It is a global network of networks connecting many millions of computers. Currently, the Internet has more than 30 million users world wide, and that number is growing rapidly. More than 100 countries are linked into exchanges of data, news and opinions on Web servers. Unlike online services, which are centrally controlled, the Internet is decentralized by design. Each Internet computer, called a host, is independent. Its operators can choose which Internet services to provide to its local users and which local services to make available to the global Internet community. Remarkably, this anarchy by design works exceedingly well. This paper describes how information can be downloaded from the internet. It also lists websites displaying mushroom related information which can be useful to students, research personnel and mushroom growers.

Keywords: Internet, web, online, information, mushroom

INTRODUCTION

Developed during the cold war, the original objective of the internet was to set up a network which would be immune to attack: if part of it were destroyed, the rest would continue functioning by re-routing communication through connections and computers that have survived (Gautam Y, 2003). Hence the decentralized nature of the internet. Internet is like a huge database with information on every aspect of mushroom research and development available on it (Gautam Y, 2002). It can be a very useful source to a user requiring information on mushrooms. The only thing a user must know is how to extract the desired information from it. It contains information on all aspects of mushroom cultivation right from composting, spawning, cropping to post harvest processing and marketing. The information can be utilized by students, growers, consultants, marketers. With more and more people using the internet, it can be the most powerful media for advertising mushrooms and mushroom products.

Long distance collaboration

The use of the Internet for long distance collaboration between research institutes and the possibility for its eventual development as a farm tool are discussed. The use of video image analysis (VIA) and the transfer of VIA data to the internet is examined and an example is presented of the procedures used by ISMA (Italy) and Astra-Tek (India) to visually compare test results of pesticide coverage on grapevine leaves. It is concluded that, if developed systematically, the system could form the basis for the development of remote support services for farmers, farm technicians and agricultural organizations (Menesatti-P, 1998).

The use of the Internet and the World Wide Web (WWW) to supply information and decision support in agriculture is discussed with reference to the development of PlanteInfo, a Danish information system for crop production on the Web. WWW can be used to build collaborative information systems, where institutions with different fields of expertise contribute with modules of information resources (Jensen et al,1997). Some of the websites related mushroom research , production and trade are given in Table 1.

Awareness generation

In India people have many reasons for not taking mushrooms. Some say that it is a non-vegetarian diet, others are not aware of its qualities. The total consumption will increase only when more people start taking mushrooms or people already taking mushrooms start taking more mushrooms. People will start taking more mushrooms when they become aware of the nutritional/medicinal qualities of mushrooms. On the other hand more people will start taking mushrooms when their doubts regarding mushroom status are removed. In both these cases awareness will play a very important role. Internet is the best possible way of creating this awareness. Now most of the educated people have access to internet and once it gets to their mind that mushrooms are rightly being publicized as “the health food”, they are definitely going to start taking them more often.

Mushroom Kits for the Beginners

Mushrooms can easily be grown using kits, which are available in supermarkets and nurseries in the European countries. The kit consists of a growing box, spawn and compost. They can also be grown in trays, raised beds and large plastic bags. The kits are kept in a cool dark place, and the first mushrooms can be ready to harvest in 2-3 weeks. Further crops occur every week or so. After termination of the crop the compost is used as a mulch, or dug into garden beds.

Indian Scenario

Steps have already been taken in India to harness the internet revolution in agriculture. Broadband facilities are being provided by the BSNL and other private players. This has improved the connectivity speed and sending/receiving of multimedia files is fast and so is the downloading. The first National Spot Exchange for Agriculture Production (NSEAP) was set up in February' 2005 paving the way for linking all Agricultural Produce Marketing Cooperatives (APMCs) and other physical market players on an electronic platform. An MOU has been signed among Financial Technologies India (FTIL), Multi-Commodity Exchange (MCX) and NAFED with the State Bank of India as the principal clearing and settlement bank of the exchange. This will integrate the whole nation into a single commodity market place.

The NSEAP has planned to act as an integrated market for all 7315 APMCs of the country dealing in 140 crops with a cumulative annual turnover of Rs. 3095 billion⁶. It will result in major agro-business enterprises procuring directly from the production centres at very remunerative prices to the farmers. The present annual e-commerce related business has been estimated at Rs. 570 crores and is increasing every year at 50%. The Agricultural and Processed Food Products Export Development Authority (APEDA) is helping in marketing by promoting export of agriculture and allied industries. It is giving financial assistance for food transport and export, helps in getting licenses for export and maintains a directory of importers and exporters of agricultural commodities and processed foods. It lists the export

statistics on the web site and the Virtual Booth Directory of Exporters on its site. The figures of fresh and canned/processed mushrooms exported from India are shown below.

Export of Fresh and Canned/Processed mushrooms from India

India is exporting button, oyster and morels to other countries of the world. The total export of morels from India during 2016 was of Rs. 4,76,16,471 as per data obtained from different ports. France, Germany, Hong Kong and Switzerland were the major importers of morels from India.

How to download information from the Internet

When Netscape or Internet Explorer is used as a browser, Webpages can be downloaded to view offline. Webpages also contain graphics, audio and video files and programmes such as Java script and Visual Basic. In the browser file menu selecting save as option will allow a user to change folders (directories) or the file name. "My documents" folder can be used or a special folder can be created for the downloads. HTML files will save with a .html or .htm tag and text files will have a .txt tag.

It is easy to print a webpage online by choosing print from the file menu. It is difficult to know where pages start and finish on the internet, hence if the print of only a small section is desired, it is probably better to highlight (block) the section that is desired and choose from the file print or right click the highlighted text and choose print. Files that have been saved can also be printed by first opening them in the browser or word processor.

Often files on the Internet are in pdf (portable document format) because this format can be used by both PC and Mac users. Also, the author of the file does not have to worry what word processor or version of the word processor that the target audience has. The programme that reads these pdf files, Adobe Acrobat Reader, is available free on the Web for downloading. If Acrobat Reader is installed on the users' computer, when the link for your pdf file is clicked, Acrobat Reader will open up, displaying the text and graphics in the document. Clicking on the disk to save- the folder can be selected where the document will be saved as a .pdf file which can be read later by either opening up Adobe Acrobat Reader or by opening the file in the browser which automatically opens up Adobe Acrobat Reader.

Internet application in mushroom research and trade

a) Mushroom Research

With such huge amount of information available on the internet, it has really proved to be an asset to a research scientist working on mushrooms. He may be working on any aspect of mushroom cultivation (production, protection, improvement, processing, marketing, extension) he can have an access to all the developmental and research activities taking place throughout the world. He can view the material presented in the website or correspond with the institute/organization and request additional information desired. He can have online access to their databases, CDROMs, of course all the information desired may not be free. Institutes may have joint/collaborative research programmes. Researchers can take the benefit of on-line education/training.

Mushroom Production

A person planning to grow mushrooms can get all the necessary information required before plunging into this enterprise. He can get information on different mushrooms that can be cultivated/ are being cultivated and the basic requirements for growing mushrooms or which mushrooms are important in the world market. It could be concerned with preparation of the project report, identification and selection of financiers, finding the addresses of the firms dealing with insulation, air conditioning units, blowers, etc. In other words, internet will help him in doing all the spadework that has to be done before starting the enterprise. He will have a number of options available and can choose the best.

The training / technical guidance required for compost making is available on the internet and so are the addresses of compost suppliers if required. He can search on the internet and the information on various institutions/organizations/individuals providing training in this field will be available. He can correspond with them and get necessary information online. He can also search the addresses of the units selling compost and get in touch with those near his place. He can correspond with them and negotiate the terms for buying compost.

b) Mushroom Trade

When the infrastructure is ready the production has to start so that returns start coming in. The bags are put in the cropping room and the environmental parameters maintained within the desired limits to get a healthy crop. In the meantime he can search for potential buyers/exporters of mushrooms so that all the produce gets sold readily. He can get all the related information on the internet. Information relating to the current market rates of mushrooms in different markets, requirements of various sellers and marketers can also be downloaded. A mushroom which has very low market value in India may be of great importance in international market. Its production could fetch many times more monetary benefits.

Besides getting all this information from the internet, a mushroom producer can launch his web site on the internet. In the web site he can give all the information related to his farm (location, produce quantity, rate, other special features etc.) so that customers are attracted to his farm or the place where he is selling his mushrooms. He can directly contact the buyers and sell them with no intermediaries.³

Packaging of a product plays very important role in its marketability. Consumers are attracted towards a smartly packaged product. These days there is tremendous competition in the way a product can be packaged. In India, mushrooms are normally marketed in plain polythene bags with no information on it. But recently it has been seen that some innovative growers have started using printed poly packs for packing mushrooms. Not only these are attractive to see, but the information printed on the pack catches the attention of a customers. He is forced to read it and has a chance of comparing this pack with any other mushroom packet available in the market. There is more chance that a customer will go for the pack which has some information about the product inside.

It is a fact that the shelf life of mushrooms is less so they have to be marketed almost immediately after harvesting and packing. But there are certain methods by which he can prolong its shelf life. Surplus mushrooms can be processed for sale. He can search the internet and get the desired information relating to new methods of storage and products that could be made from mushrooms. Even today many people are not aware of the wide range of products that can be made from mushrooms.

There is a large number of dishes that can be made from mushrooms. A hotel/restaurant in North India may not be aware of the dishes of mushrooms being prepared in the South. In one of our projects which involved conducting a survey for determining the mushroom consumption trends we came to know of many dishes in the area which we didn't know before. Surely, a majority of the people will find these names to be new (chilli mushroom, khumb pulao, khumb dolma to name a few). There are certain websites which tell us about various dishes. Hotels/restaurants can be innovative in preparing new attractive dishes so that customers are attracted towards them. As more and more people start taking mushroom dishes in restaurants, its consumption will increase which will ultimately benefit the mushroom industry.

Use of e-commerce in Buying/Selling of mushrooms

Electronic commerce (or e-commerce) can be defined as conducting or enabling the buying and selling of goods or services through electronic networks or any form of business transaction in which the parties interact electronically rather than physical exchanges or direct physical contact. The steps involved are accessing the network, locating a trading partner, completing the order transaction, securing payment and delivering goods or services. E-commerce can support a trader through World Wide Web pages, inter-organizational e-mail, trading support systems for commodities, products and services, ordering and logistic support systems, settlement support systems, and management information and statistical reporting systems. It is, in general, a combination of technologies, applications, processes and business strategies.

E-commerce (Gautam Y, 2003) can be used very effectively for buying/selling of mushrooms and mushroom products. Eighty percent of the global Fortune 2000 companies each have a web site and small businesses have found that the internet provides them with powerful marketing tools and opportunities for expansion. E-commerce promises great payoffs by extending the best benefits of internal IT streamlined processes, simplified sharing of critical data, lower organizational barriers. It provides a new sales and marketing channel which can increase product or service awareness, offer low-cost access to new geographical markets, provide real-time customer information, and shift existing customers to a lower cost distribution channel, thereby attracting new customers.

Table 1. Websites displaying mushroom related information.

Website	Information available	Country
www.nrcmushroom.org	Information related to the Projects, Faculty, facilities available at the Centre, picture gallery etc. are available on the official website of the National Research Centre for Mushroom.	India
www.occi.ab.ca	The CTC processes 5000 tonnes of organic residues on an annual basis. Information on three types of composting pads at the CTC i.e. a cement pad where half of the area is under cover, an open asphalt pad, and a compacted clay pad is available.	Canada
www.techmark-inc.com	Stockists of assortment of spare parts for most systems and equipment for quick delivery. Spare parts include relays, RH sensor wick, LEDs, sensors, wire, switches, switch boots, seals, IC boards, potentiometers and assemblies, actuators and pumps.	USA
www.americanmushroom.org	<u>Growing Mushrooms</u> , <u>Mushroom Compost</u> <u>Growing Agaricus Mushrooms</u> , <u>Mushroom Statistics</u>	USA
http://usda.mannlib.cornell.edu/reports/nassr/other/zmu-bb	Statistical information of agricultural products	USA
http://forums.gardenweb.com/forums/load/cangard/msg0500390116804.html	Forum	Canada
http://www.horttips.co.uk/mush_4.htm	Important tips on mushroom growing	UK
www.hdc.org.uk/		UK
www.mushroomcouncil.org	Mushroom production,sale,marketing	Dublin
http://www.mushroomadventures.com/compost.html	Comosting tips, mushroom kits, recipes, growing	USA
/howtocompost.org/	Forum	
http://www.acs.edu.au/contact.asp	Educational information, admission, faculty etc.	Australia
www.teagasc.ie	Irish mushroom information	Ireland
/www.diy.net.com/	Do it yourself kits	USA
http://www.mushroomcompany.com/	Table of Contents to The Mushroom Growers' Newsletter	
www.bhg.com.au	Gardening	Australia
www.hri.ac.uk	Research, education, projects related information	UK

The ICAR-Directorate of Mushroom Research launched its website (www.nrcmushroom.org) in the year 2000. The traffic on the web site was very heavy. The web site had a total number

of 1200 visitors in the first year which increased to 3000 in the subsequent year and remained almost steady in the next two years.

It is clear from the data that the number of growers accessing the Centre's website has increased from a mere hundred the first year to 181843 in the current year. There are around 7000 visitors to the website per month. Similarly the number of foreign visitors to the Website increased from around 50 per month from the beginning 9 to around 2500 per month recently. The increasing number of growers accessing the site is an indication of the popularity of the site.

The Centre also conducts training programmes on mushroom production technology for farmers, entrepreneurs, SMS, international trainees etc. Table 2 shows the percentage of trainees who had used internet for accessing mushroom related information. This shows that the number of people using internet for access to information for mushroom research and development are increasing at a rapid rate.

The Website is regularly updated and contains information related to the employees, different Committees, Research projects, Annual Reports, Training and Extension material. All leaflets/folders printed for popularization of mushroom cultivation have been displayed on the website in pdf format. Regular advisories are being given to farmers. A photo gallery is also existing which contains photographs of important events at the Directorate. It also displays the success stories of mushroom growers and the list of leading mushroom growers of India.



Table 2. Trainees with internet knowledge

Year	Farmers Training (%)	Entrepreneurs Training (%)	SMS Training (%)
2002	12	75	87
2003	34	83	90
2004	72	78	-
2015	100	100	100
2016	100	100	-

Now the percentage has gone up to 100% as the trainees have to register online and pay the fees also in a cashless mode.

Mobile facebook and Whatsapp applications

Three Mobile apps have been developed which are:

1. DMR-FFCC, ICAR-MUSHROOM

It includes the catalogue for fleshy fungi collected at ICAR-DMR from 1983-2016.

2. ICAR DMR

It includes information related to DMR, services available, Training details, mushroom profile and information related to cultivation of button, oyster, milky, paddy straw and shiitake.

3. ICAR-MUSHROOM

ICAR-MUSHROOM includes Health benefits, technologies, Products, Links, Resources, Notifications, Photo gallery, FAQs and weather related information. It has shown more than 5000 downloads in around three months of its development.

Facebook page is being utilized for sharing information related to mushroom cultivation and important events at the Directorate. Some videos have related to mushroom cultivation have also been uploaded on Youtube.

A Whatsapp group is also running which is a platform to share information related to mushroom cultivation.

CONCLUSION

There is no doubt that internet can prove to be a very important tool in mushroom research, production and trade. It can also prove to be a decisive tool in the intense competition in advertising and marketing of mushrooms. It is a boon, both for the suppliers and for the customers. While suppliers get the best rates available in the market, the customers get the best range available in the market. There are no middle men involved, hence a buyer has direct contact with the seller. The government has also taken up the challenge and is helping the farming community through e-bridges, e-choupals, information kiosks at village levels and launching the websites of the horticulture and agriculture departments. If a person desires to be among the leaders, be it in any field, he cannot afford to miss the internet bus.

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