INFORMATION LITERACY AND SCIENTIFIC INFORMATION RETRIEVAL

Yerevan, Armenia, 2009
Presentation by Tomaz BARTOL

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1 General characteristics of information retrieval

1.1 Boolean searches and search syntax (search operators)

Table: Boolean operators

<table>
<thead>
<tr>
<th>Boolean operator</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>OR</td>
<td>Union of sets A or B (either one)</td>
</tr>
<tr>
<td>AND</td>
<td>Intersection of sets A and B (both of them)</td>
</tr>
<tr>
<td>NOT (AND NOT)</td>
<td>Exclusion of one set</td>
</tr>
</tbody>
</table>

![Boolean operators diagram](http://www.library.uiuc.edu)

Figure: Search operators and retrieval functions (picture source: http://www.library.uiuc.edu)

Examples:

**OR**

apricot* OR prunus armeniaca OR "p. armeniaca"
pest* OR parasit*
pig OR pigs OR swine
trad* OR market* OR sales OR price* OR econom*
"zea mays" OR corn OR maize

*(Generic capitalisation such as Prunus, Zea can be ignored while searching)*

**AND**

("zea mays" OR corn OR maize) AND (pest* OR parasit*)
(trad* OR market* OR sales OR price* OR econom*) AND (wheat OR cereal*)

**NOT**

(pig OR pigs) NOT guinea
horse* NOT chestnut NOT radish

*(Some caution is needed because some terms can be written as compound words: horsechestnut, horseradish …)*
1.2 Truncation, stemmer, priority

**Wild card**, e.g. asterisk character *, substitutes zero or more characters.

*HORSE-* -> horse* - > horse, horses but also horsebean, horsechestnut, horseradish ...  
*PIG-* -> pig* - > pig, pigs, pigeon, pigment ... , better to use Boolean OR - > pig OR pigs  
*PROGRAM* - > programme, programmes, program, programs (but also programming ... )

Some systems require other wild cards, for example ? or $. Some systems also offer a possibility to truncate within a word, again substituting different number of characters, depending on a system.

**ANALY?E** -> analyse OR analyze  
**COLO$R** -> colour OR color  retrieval of both British or American variants

Depending on a system, a wild card can substitute exactly one or any one character. In case of substituting any one character attention should be paid to possible information-noise.

**ANTI*SIVE** -> anticorrosive, antiadhesive, antihypertensive ...

**Stemming, stemmers**

Truncation is generally not possible with internet search engines. Some search engines, however, increasingly offer a utility of stemming, i.e. mapping of related word forms (singular, plural) to the same stem. A retrieval with PLANT DISEASE (singular form of disease) may also return documents on PLANT DISEASES. Given the lexical wealth of languages it is not always clear which related words (e.g. adjectives) will be associated so retrieval can not rely solely on stemming.

**Priority, phrases**

Brackets and quotation marks (apostrophes) usually define a priority of a Boolean search and word order in phrases.

(CORN or MAIZE or ZEA) and (DISEASE* or PEST*)  
"PEST CONTROL", "KEY WORD*" <-> KEYWORD*, "DATA BASE*" <-> DATABASE*

Some systems, may not understand a wild card within a phrase. Help programmes should better be consulted prior to complex retrieval attempts.

1.3 Synonyms, associated or related terms

**APRICOT** * <-> Prunus armeniaca, P. armeniaca  
**WOOD** <-> timber  
**PIGS** <-> swine  
**MEDICINAL PLANTS** - > medicinal herbs, drug plants, herbal remedies, herbal medicine, heals healing herbs, healing plants, herbal supplements, herbal therapy...  
**TRADE** - > trad* (trading, trade), market*, sales, price*, econom*, business*  
**PUMPKIN** * - > marrow*, zucchini, courgette
2 Terminological issues: Subject headings, descriptors, classification

Subject headings are controlled terms which are used to describe a subject by merging several different synonyms or related terms. Subject headings for the same subject can be different in different information systems.

Classifications or subject categories are usually employed for indexing of concepts on a broader level. Descriptors are employed for indexing of concepts on a more precise level. Most information systems employ several dozen categories and several thousands descriptors organised in thesauri (Thesaurus).

**AGRIS**
Descriptors - *Thesaurus AGROVOC* (FAO): 17,000 descriptors and more than 10,000 non-preferred terms (freely available on the WWW)
http://www.fao.org/aims/ag_intro.htm
Category Codes: Agris Subject Categories - 115 different subject categories from all areas of agriculture (freely available on the WWW)

**AGRICOLA**
Descriptors - *NAL Thesaurus* (NAL-National Agricultural Library): 45,000 descriptors and 28,000 non-preferred terms (freely available on the WWW).
Category Codes: Subject Category Codes - 230 different subject categories from all areas of agriculture (freely available on the WWW).
http://agricola.nal.usda.gov/help/categorycodes.html

**CAB ABSTRACTS**
*(available only with a password)*
Category Codes: CABI Codes - 250 different subject categories from all areas of agriculture (freely available on the WWW).
http://www.cabi.org/guides/cabicodes.htm

**Medline database**
Descriptors - *MeSH (National Library of Medicine)* - *Medical Subject Headings* - 25,000 descriptors and 160,000 non-preferred terms, also covering food and nutrition and veterinary topics (freely available on the WWW). http://www.nlm.nih.gov/mesh/
2.1 AGROVOC

- Copyright Information
- Knowledge
- Organization Systems
  - By Type
  - By Subject area
  - Suggest KOS
- Browse classification schemes
- AGROVOC in AOS
- Ontology relationships
- NeOn

**Figure: FAO AGROVOC Thesaurus - older version**

<table>
<thead>
<tr>
<th>Labels</th>
<th>Status</th>
<th>Scope</th>
<th>Created</th>
<th>Last modified</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ducks</td>
<td>Descriptor with relations (20)</td>
<td></td>
<td>1981-01-01</td>
<td>1998-11-05</td>
</tr>
<tr>
<td>Canard</td>
<td>Descriptor with relations (20)</td>
<td></td>
<td>1998-09-09</td>
<td>2005-08-09</td>
</tr>
<tr>
<td>Pato</td>
<td>descriptor with relations (20)</td>
<td></td>
<td>2002-12-12</td>
<td>2002-12-12</td>
</tr>
<tr>
<td>鴨 (AR)</td>
<td>Descriptor with relations (20)</td>
<td></td>
<td>2002-12-12</td>
<td>2002-12-12</td>
</tr>
<tr>
<td>鴨 (ZH)</td>
<td>Descriptor with relations (20)</td>
<td></td>
<td>1998-08-04</td>
<td>1998-08-04</td>
</tr>
<tr>
<td>鴨 (PT)</td>
<td>Descriptor with relations (20)</td>
<td></td>
<td>2003-03-27</td>
<td>2003-03-27</td>
</tr>
</tbody>
</table>

**Figure: FAO AGROVOC Thesaurus, multilingual application - new version**

**Figure: FAO AGROVOC Thesaurus - hierarchical tree**

- Narrower Terms
- Broader Terms
- Related Terms
- MULTILINGUAL DESCRIPTORS

**Figure: FAO AGROVOC Thesaurus**

- DESCRIPTOR
- DESCRIPTOR

Bartol, T. 2009. Information literacy and scientific information retrieval
2.2 NAL Thesaurus

Figure: NAL Agricultural Thesaurus: descriptor "apricots"

Figure: NAL Agricultural Thesaurus: descriptor "milk"

Figure: Example of NAL Agricultural Thesaurus: descriptor "cattle"
2.3 **CAB Thesaurus**

(accessible only through password through CABDIRECT)

<table>
<thead>
<tr>
<th>Descriptor</th>
<th>History Note</th>
<th>Used For</th>
<th>Narrower Terms</th>
<th>Broader Terms</th>
<th>Related Terms</th>
</tr>
</thead>
<tbody>
<tr>
<td>cattle</td>
<td>From 1983.</td>
<td>Bos taurus; oxen;</td>
<td>beef cattle; bulls; calves; cows; dairy cattle; dual purpose cattle; feral cattle; freemartins; heifers; steers;</td>
<td>Bos; livestock;</td>
<td>skin producing animals; cattle breeds; cattle diseases;</td>
</tr>
</tbody>
</table>

Figure: Example of CAB Thesaurus: descriptor "cattle"

<table>
<thead>
<tr>
<th>Descriptor</th>
<th>Used For</th>
<th>Narrower Terms</th>
<th>Broader Terms</th>
<th>Related Terms</th>
</tr>
</thead>
<tbody>
<tr>
<td>irrigation</td>
<td>Renigation; watering;</td>
<td>basin irrigation; border irrigation; flood irrigation; microirrigation; mist irrigation; overhead irrigation; pulse irrigation; subsurface irrigation; surface irrigation; trickle irrigation; water management; chemigation; cultural methods; fertigation; fogging; hoses;</td>
<td>irrigation channels; irrigation equipment; irrigation requirements; irrigation scheduling; irrigation systems; irrigation water; plant water relations; soil management; water requirements; water spreading;</td>
<td>hoses; hydraulic structures; hydroponics; irrigability surveys; irrigated conditions; irrigated farming;</td>
</tr>
</tbody>
</table>

Figure: Example of CAB Thesaurus: descriptor "irrigation"
2.4 MeSH

Figure: Example of NLM MeSH Thesaurus: descriptor "diet"

Figure: Example of NLM MeSH Thesaurus: descriptor "animal feed"
### Table: Hierarchical, associative and preferential relations for the term food (AC=Agricola, AS=Agris, CAB=CAB ABSTRACCS, FS=Food Science and Technology Abstract, ME=Medline/Pubmed)

<table>
<thead>
<tr>
<th>Descriptor</th>
<th>Narrower Term</th>
<th>Related Terms</th>
<th>Non descriptors</th>
</tr>
</thead>
<tbody>
<tr>
<td>AC foods (BT agric. products, food &amp; human nutr.)</td>
<td>animal-based foods, appetizers, batters ... weaning foods, whipped foods, wild foods /93/</td>
<td>diet, food industry, food preparation, food prices, food processing ... food transport /7/</td>
<td>food products</td>
</tr>
<tr>
<td>AS foods (BT 0)</td>
<td>bakery products, beverages, confectionery ... simulated foods, soups /21/</td>
<td>cereal products, cereals, dried products ... sugar, vegetable products, vegetables /23/</td>
<td>food contamin., f. products, f. quality, foodstuffs, freshness of f. /5/</td>
</tr>
<tr>
<td>CB foods (BT food)</td>
<td>batters, beverages,... tropical foods, unconventional foods, wild foods/37/</td>
<td>codex alimentarius, diets, edible cultivars ... plant products, vegetables /35/</td>
<td>0</td>
</tr>
<tr>
<td>FS foods (BT 0)</td>
<td>animal foods, fresh produce ... plant foods, processed f., sea foods /10/</td>
<td>0</td>
<td>food products, foodstuffs /2/</td>
</tr>
<tr>
<td>ME food (BT food and beverages)</td>
<td>bread, cereals, agricultural crops (animal feed) honey/24/</td>
<td>diet ... nutritional requirements, edible plants /5/</td>
<td>nutrients</td>
</tr>
</tbody>
</table>

### Figure: Difference of subject headings with regard to a similar indexing term
3 Bibliographic Databases

3.1 AGRIS

Agris is international multilingual cooperative bibliographic information system, compiled by the FAO, in cooperation with agricultural information centres of the FAO member countries. It contains several million bibliographic references, with links to many full-text documents in the more recent period. It is freely available at http://www.fao.org/Agris/

Figure: Access to Agris (Homepage)

![Access to database]

Figure: Search syntax in Agris database

![Boolean syntax in Agris requires capitalisation of OR; operator AND is represented by white space only]
Figure: Access to full-text articles in Agris database-A

Links to full-text articles (pdf)

Genetic collection and development of near-isogenic lines in durum wheat

Watanabe, N., Ibaraki University, College of Agriculture (Japan).

Genetic collections of tetraploid durum wheat are utilized to develop near-isogenic lines in durum wheat. The genes to be linked are substitution lines, and the linkage maps using aneuploid substitution lines, and the genes to be linked are mapped to specific chromosome and mapped to the indigo D-genome chromosome. Mapping of the genes for long glumes on chromosomes 7A and 7B, genes for brittle rachis on chromosomes 3AS and 3BS and the gene

Spontaneous ignition of biodiesel: a potential fire risk

Shibata, Y., Nagoya University, Nagoya (Japan), Graduate School of Natural Sciences, Nagoya City Fire Bureau; Koseki, H., National Research Institute of Fire and Disaster, Tokyo (Japan); Shimizu, O., Nagoya University, Nagoya (Japan), Graduate School of Natural Sciences.

The main conclusion to be drawn from the results obtained is that biodiesel has significantly higher risk of spontaneous ignition compared with vegetable oils. This is very important information to minimize the fire risk in biodiesel production facilities and so

Figure: Access to full-text articles in Agris database-B
Bartol, T. 2009. Information literacy and scientific information retrieval

Figure: Access to Agris documents through Google Scholar

- **Booleans syntax according to Google** (more in Chapter 7.1.1)
- **Bibliographic record available through Google**

---

**Record number**: XF8553073  
**Titles**: Revised descriptor list for apricot (Prunus armeniaca)  
**Personal Authors**: Guerriero, R., (ed.); Watkins, R., (ed.)  
**Corporate Authors**: International Board for Plant Genetic Resources, Rome (Italy); Commission of the European Communities Committee on Disease Resistance Breeding and Use of Genebanks  
**Publisher**: IBPGR Secretariat  
**Publisher Place**: Rome (Italy)  
**Publication Date**: 1984  
**AGROVOC Terms**: APRICOTS; PRUNUS ARMEIACA; PLANT COLLECTIONS/DOCUMENTATION, APRICOT; PRUNUS ARMEIACA; BOTANIQUE / DOCUMENTATION, ALBARICOQUE; PRUNUS ARMEIACA; COLECCION DE PLANTAS / DOCUMENTACIO; COLLECTIONS, CROPS, DICTYOTELOIDS, ECONOMIC PLANTS, FRUIT CROPS, INFORMATION SCIENCE, PLANTS, ROSACEAE, ROSEALES, TEMPERATE FRUITS, COLLECTION, DICTYOTELOID, FRUIT TEMPERE, PLANTE, PLA; ECONOMIQUE, PLANTE DE CULTURE, PLANTE FRUITIERE, PRUNUS, ROSACEAE, ROSEALES, SCIENCE DE LA CIENCIA DE LA INFORMACION, COLECCIONES, CULTIVOS, DICTYOTELOIDAS, FRUTALES, FRUTAS DE CL; PLANTAS, PLANTAS DE VALOR ECONOMICO, PRUNUS, ROSACEAE, ROSEALES  
**Language**: En  
**Notes**: FAO Accession No: XF8553073 (Available on Microfiche)  
**Collation**: 36 p.  
**Availability**: FAO of the UN (Italy)  
**Availability number**: 8553073

**Figure: Agris document on Google Scholar**
3.2 AGRICOLA

Agricola is an international bibliographic information system, compiled by the National Agricultural Library (NAL) of the US. It contains several million bibliographic references, with links to many full-text documents in the more recent period. It is freely available at http://agricola.nal.usda.gov.

Pay attention to "any of these" = Boolean OR and "all of these" = Boolean AND

Subject: Search term occurs in descriptor field

Truncation of search term with question mark

Figure: Search syntax in Agricola database
**Database Name:** Article Citation Database  
**Search Request:** Search = (prunus AND armeniaca) [In Keyword Anywhere]  
**Search Results:** Displaying 1 through 25 of 1209 entries.

<table>
<thead>
<tr>
<th>#</th>
<th>Date</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2009</td>
<td>Application of ATR-FTIR for a rapid and simultaneous determination of sugars and organic acids in apricot fruit [electronic resource].</td>
</tr>
<tr>
<td>2</td>
<td>2009</td>
<td>Apricot and peach breeding programs from the IVIA.</td>
</tr>
<tr>
<td>3</td>
<td>2009</td>
<td>Cell-to-cell transport through plasmodesmata in true callus cultures.</td>
</tr>
<tr>
<td>4</td>
<td>2009</td>
<td>Change in anthocyanin concentrations in red apricot fruits during ripening [electronic resource].</td>
</tr>
<tr>
<td>5</td>
<td>2009</td>
<td>Characteristics and transferability of new apple EST-derived SSRs to other Rosaceae species [electronic resource].</td>
</tr>
<tr>
<td>6</td>
<td>2009</td>
<td>Cross-transferable polymorphic SSR loci in Prunus species [electronic resource].</td>
</tr>
<tr>
<td>7</td>
<td>2009</td>
<td>Detection of QTLs controlling major fruit quality components in peach with the European Project ISAFRUIT.</td>
</tr>
<tr>
<td>8</td>
<td>2009</td>
<td>Estrella' and 'Sublime' Apricot Cultivars.</td>
</tr>
<tr>
<td>9</td>
<td>2009</td>
<td>Evaluation of a germplasm collection of some fruit tree varieties concerning genetic resistance to abiotic factors.</td>
</tr>
<tr>
<td>10</td>
<td>2009</td>
<td>Evaluation of the current apricot variability in Tunisia—comparison with previously described cultivars.</td>
</tr>
<tr>
<td>11</td>
<td>2009</td>
<td>Evolution of apricot fruit quality attributes in the new released cultivars.</td>
</tr>
</tbody>
</table>

**Figure:** Example of Prunus-armeniaca-related bibliography

**Title:** Application of ATR-FTIR for a rapid and simultaneous determination of sugars and  
**Author:** Bureau, Sylvie  
Ruiz, David  
Reich, Maryse  
Gouble, Barbara  
Bertrand, Dominique  
Audergon, Jean-Narc  
Renard, Catherine H.G.C.  

**Found In:** Food chemistry. [Amsterdam]: Elsevier Science 2009 Aug. 1, v. 115, no. 3  
p. 1133-1140.  
ISSN 0308-8146  

**Abstract:** A simple, fast and accurate Fourier transform mid-infrared spectroscopy method with the attenuated total reflectance. The potential of this method coupled with chemometric determination of fructose, glucose, fructose, malic acid and citric acid. Results of eight calibration sets (505 apricots) and in a validation set (252 apricots). The most  

**Note(s):** Includes references  
**Electronic Resource:** Available from publisher's Web site  
**NAL Subject(s):** rapid methods  
food analysis  
food chemistry  

**Figure:** Access to full-text articles in Agricola database
3.3 **CAB Abstracts**

CAB Abstracts is an international bibliographic information system, compiled by the CAB International. It contains several million bibliographic references. An Agora-linked section of CAB Abstracts is freely available to Agora subscribers.

![Figure: Access to CAB Abstracts through AGORA](image)

Abstracts are linked to full text articles through a journal home page.

![Figure: Search syntax in CAB Abstracts database](image)

**Entomophilous pollination in peach (Prunus persica L.).**

Sp. Hummingbird was also observed collecting nectar. Fruit production was 14% more in flowers visited by these species than those that were not.

![Figure: Link to a journal home page](image)
3.4 Pubmed / Medline

PubMed is a free search portal for accessing the MEDLINE database.


Topics follow the patterns of a standard Boolean syntax

Figure: Search syntax in PubMed

Caution in Medline: the rules of combined searches both with phrases and truncation are unclear, e.g.: "data base*" vs. "data base" vs. "data bases"
3.5 Parallel comparison of search syntax in different systems

Criterion: (apricot* OR "prunus armeniaca") AND (food* OR nutrit*)

Explanation of the criterion: we wish to retrieve any document related to apricot (both terms apply: either common apricot or scientific Prunus armeniaca) and associated either with food- or nutrition-related subjects.

Apricot is a countable name so it should be truncated with a wildcard which can be represented by a different symbol in different systems; Prunus armeniaca should preferably be delineated as a phrase; food should also be truncated because it can be represented by different terms such as foods, foodstuffs etc. Some other food-related terms, such as nutrit* (nutrition, nutritive, nutritional…), can be added to term food; in most systems it is preferable not to capitalise words (generic capitalisation such as Prunus can be ignored), except for the operator OR in Google which should be capitalised. A white space stands for Boolean AND in Google. Similar Boolean symbols apply to Agris.

AGRIS database: (apricot* OR "prunus armeniaca") (food* OR nutrit*)

Agricola database: specific way of searching
Criteria "any of these" = OR, "all of these" = AND
*PubMed database:* (apricot* or "prunus armeniaca") and (food* or nutrit*)

![PubMed search syntax](image1)

Figure: Search syntax in PubMed database

*CAB Abstracts / AGORA:* (apricot* OR "prunus armeniaca") AND (food* OR nutrit*)

![CAB search syntax](image2)

Figure: Search syntax in CAB Abstracts database (Agora)

*Google:* (apricot OR apricots OR "prunus armeniaca") (food OR nutrition OR …)

Google does not support truncation, so synonyms should be connected with a Boolean OR. More on Google search in Chapters 7.1.1 and 7.4.

![Google search syntax](image3)

Figure: Search syntax in Google
4 Full-Text portals and e-Journals (Open Access)

4.1 DOAJ

(Directory of Open Access Journals) is a web portal to more than 4200 freely available e-journals. [http://www.doaj.org/](http://www.doaj.org/)

![Figure: Home page of DOAJ](image)

![Figure: Suggesting a journal for inclusion by DOAJ](image)

It is possible to consult a specific category but it is more comprehensive to search in the database in general.

Editors can propose their journal for inclusion.

![Figure: Suggesting a journal for inclusion by DOAJ](image)
4.2 **OpenJ-Gate**

OpenJ-Gate is a web portal to more than 5600 freely available e-journals. [http://www.openj-gate.com/](http://www.openj-gate.com/)

---

**Figure: Home page of Open J-Gate**

It is possible to consult a specific category but it is more comprehensive to search in the database in general.

---

**Figure: Advanced searching in Open J-Gate**

Almost 6000 journals are freely available in full text.
Figure: Display of articles in Open J-Gate-B

Bibliographic record

Full text

Figure: Display of articles, bibliographic details of article no. 2 and link to full-text
5 Projects by the United Nations: AGORA, HINARI, OARE

AGORA, HINARI, and OARE are joint projects by United Nations and commercial publishers to offer free e-access to international peer-reviewed scholarly/research information. There are over 3000 public institutions registered in more than 100 countries in Africa, Latin America, Asia and Europe.


Utilities:
- Access to thousands of peer-reviewed international scientific journals online
- Specialist databases, indexes, and reference books
- Resources available in several languages
- Access is available free
- Users can link to abstracting and indexing databases
- Full-text articles can be downloaded for saving, printing or reading on screen
- Users can search by keyword, subject, author, or language
- Training and promotional resources and support available on request

Eligible institutions must register to receive a free password. Registration can be completed at the website.

AGORA, OARE and HINARI are related programmes of the United Nations

Figure: AGORA, HINARI, OARE - Access to the World's leading journals
5.1 AGORA - Agricultural information

The AGORA programme, set up by the Food and Agriculture Organization of the UN (FAO) together with major publishers, enables developing countries to gain access to a digital library collection in the fields of food, agriculture, environmental science and related social sciences. AGORA provides a collection of 1278 journals to institutions in 107 countries. The goal of AGORA is to improve the work of students, professors, and researchers in agriculture and life sciences. Institutions wishing to use AGORA must register with FAO. Access to AGORA is password controlled, and upon successful completion of the registration process, the institution's library will receive a password that can be used by all students, faculty and/or staff at the institution. http://www.aginternetwork.org/en/

Login is necessary for full access to search programme CAB Abstracts and for access to full text journal articles. Without login some limited browsing possibilities are also available.
Agora-related CAB Abstracts database is incorporated into Agora (more in Chapter 3.3)

**Figure: Access to CAB Abstracts through Agora**

<table>
<thead>
<tr>
<th>Agora Hain</th>
<th>About Agora</th>
<th>Registration</th>
<th>Eligibility</th>
<th>Other Initiatives</th>
<th>Partners</th>
<th>Privacy Policy</th>
<th>Journals</th>
<th>By subject category</th>
<th>By title</th>
<th>Complete list</th>
<th>By publisher</th>
<th>Training</th>
</tr>
</thead>
</table>

**Using journals through AGORA**

- Search AGORA records from the CAB Abstracts Database
- Browse journals by publisher
- Browse journals by subject category

It is possible to consult a specific category

**Figure: Agora access by journal categories**
Leading international publishers which contribute full-text articles to Agora

Figure: Agora access by journal publisher

**Browse journals by publisher**

--- SELECT A PUBLISHER ---

- Elsevier
- John Libbey Eurotext
- John Wiley & Sons
- Lippincott, Williams & Wilkins
- Massachusetts Medical Society
- MIT Press
- National Academy of Sciences
- National Research Council Canada
- Nature Publishing Group
- Oxford University Press
- Plant Management Network
- Poultry Science Association
- Public Library of Science
- Rockefeller University Press
- SciELO
- Society for General Microbiology
- Society for the Study of Reproduction
- Springer
- Taylor & Francis
- Universidad Politécnica de Valencia

**Elsevier**
- an important international publisher of peer-reviewed journals

Figure: Example of journal list by publisher Elsevier
Figure: Access to full-text articles in journal *Physiology and Metabolism* by Elsevier, ScienceDirect

Figure: Access to full-text articles in journal *Agriculture and Human Values* by Springer, SpringerLink

Figure: Institutional registration for AGORA
5.2 **HINARI - Biomedicine, including food and nutrition, veterinary information**

The HINARI (Health InterNetwork Access to Research Initiative) programme, set up by WHO (World Health Organization) together with major publishers, enables developing countries to gain access to one of the world's largest collections of biomedical and health literature. Over 6200 journal titles are now available in 108 countries. It also contains agriculture-related information, such as food sciences, nutrition, herbal medicine, animal health (veterinary medicine). [http://www.who.int/hinari/en/](http://www.who.int/hinari/en/)

![Figure: Access and login to Hinari collections](image1.png)

Some HINARI free collections are available without registration

![Figure: Free collections available through Hinari (e.g. BioMed Central)](image2.png)
To access BioMed Central it is necessary to register. Registration is free. It then gives a user a possibility to search for full-text articles.

Figure: Access to BioMed Central through Hinari

BioMed Central is an important source of food and nutrition- or animal health information

Documents on food safety

Figure: Example of BioMed Central search on "food safety"
5.3 **OARE - Environmental information, agriculture related**

OARE (Online Access to Research in the Environment) is an international public-private consortium coordinated by the United Nations Environment Programme (UNEP), Yale University, and leading science and technology publishers, to enable developing countries to gain access to one of the world's largest collections of environmental science research. [http://www.oaresciences.org/en/](http://www.oaresciences.org/en/)

![Figure: Access to OARE collections](image)

OARE - an important source of environmental information

![Figure: A possibility for test-access to Environment Index (EBSCO) without full logging in](image)

Test-access to Environment Index (EBSCO)
6 Theses and dissertations on the Web (Selection)

http://www.ull.ac.uk/resources/theseslistings.shtml#british
http://library.indstate.edu/about/units/reference/dissertations.html

These are a few free pages of some selected dissertation collections. Many universities maintain their dissertation pages. Dissertations are available more systematically through a subscription to Dissertation Abstracts from ProQuest.

Australia - Australasian Digital Theses Program
http://adt.caul.edu.au/

United Kingdom - British Library Theses Service EThOS
http://ethos.bl.uk/Home.do /free login/

France - Le catalogue du Système Universitaire de Documentation
http://www.sudoc.abes.fr/xslt/

Canada - Theses Canada Portal
http://www.collectionscanada.gc.ca/thesescanada/index-e.html

Austria - Österreichische Dissertationen und Habilitationen
http://media.obvsg.at/dissdb

Germany - Katalog der Deutschen Nationalbibliothek
http://dispatch.opac.ddb.de/DB=4.1/START_TEXT

Germany - Informationssystem von Dissertationen und Habilitationen
http://www.dissonline.de/

Netherlands - Promise of Science; doctoral e-theses from all Dutch universities. It is a subset of NARCIS and the entry Publications
http://www.narcis.info/index
7 Web utilities and search engines

7.1 Web retrieval

7.1.1 Boolean logic: or=OR, and=blank space

It is possible to set up a more precise Boolean search syntax also in WWW search engines.

7.1.2 Domain-specific information retrieval: site and URL

Country code top-level domains: site:am, si, de, ... tv, dj, la ...

Search can be limited to selected domains.
2. **Generic top-level domains:** site:com, org, net, biz (new), cat, ... edu, gov, mil

![Figure: Retrieval on the Internet - Search for a specific free-text term limited to generic top-level domains](image)

**Search can be limited to selected generic domains**

3. **Web address (anywhere): inurl:**

![Figure: Retrieval on the Internet - Search for occurrence of a term in the URL](image)

**Search can be limited to selected expressions in URL, e.g. URL pages of specific institutions**

![Figure: Retrieval on the Internet - Search for a free-text specific term and limits to the URL](image)
7.1.3 Format-specific information retrieval: pdf, xls, doc, ppt

Figure: Retrieval on the Internet - Search for a title-specific term and limits to a document type

Figure: Retrieval on the Internet - Search for a free-text term and limits to a document type
7.2 Automatic Internet utilities: calculator, converter, current time

Calculator

![Calculator on Google](image)

**Figure: Calculator on Google**

Conversion of units

![Units conversion on Google-A](image)

**Figure: Units conversion on Google-A**

![Units conversion on Google-B](image)

**Figure: Units conversion on Google-B**
Figure: Currency conversion on Google-A

Figure: Currency conversion on Google-B

Figure: Current time on Google
7.3 Automatic translation tools

Google Translate: Translation by URL

Automatic translating tools can translate entire Web pages. Sometimes not all elements on a Web page will be translated, depending on the design of the original Web page. Unrecognised words will also be left untranslated.

Figure: Google Translate page - Text or Web translation

Figure: Original Web page (in Slovenian)

Figure: Translation of a Web page (from Slovenian to Russian)
Translation of a database abstract

<table>
<thead>
<tr>
<th>S record</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number</td>
</tr>
<tr>
<td>Utilization of Pakistani apricot (Prunus armeniaca L.) germplasm for improving Brix levels in California trees</td>
</tr>
<tr>
<td>Authors</td>
</tr>
<tr>
<td>Food and Agriculture Organization, Rome (Italy)</td>
</tr>
<tr>
<td>Place</td>
</tr>
<tr>
<td>On Date</td>
</tr>
<tr>
<td>Obj. Cat.</td>
</tr>
<tr>
<td>Terms</td>
</tr>
<tr>
<td><a href="http://www.biodiversityinternational.org/pgm/newsletter/article.asp?lang=en&amp;id_article=2648&amp;issue=140">http://www.biodiversityinternational.org/pgm/newsletter/article.asp?lang=en&amp;id_article=2648&amp;issue=140</a></td>
</tr>
<tr>
<td>Abstract</td>
</tr>
<tr>
<td>p. 14-22</td>
</tr>
<tr>
<td>Bioversity (Italy)</td>
</tr>
</tbody>
</table>

Figure: An original database record - Abstract to be translated by automatic translation tools

Figure: Google Translate page - Text or Web translation

Abstracts from databases can be translated as copy-pasted text
A 1988 plant collection expedition to the northern regions of Pakistan led to the introduction of 53 Prunus armeniaca L. seedlots into the United States. Portions of these seedlots were distributed to interested breeders. These Pakistani apricots are characterized as having extremely high Brix when compared with adapted apricot germplasm. These Pakistani apricots were developed by crossing Prunus armeniaca L. with other species of Prunus to produce hybrids that are adapted to the growing conditions in Pakistan. The crosses were made in the early 1980s and the seedlings were distributed to breeders in the United States in the late 1980s.

Translation is done by a machine so it is very rudimentary and can serve only as an approximate information.

The same original text can be translated differently by different machine tools.
Figure: FOL automatic translation of article "Utilization of ... adapted apricots"-A

Figure: FOL automatic translation of article "Utilization of ... adapted apricots"-B
7.4 Scientific information on the WWW: Google Scholar

Google scholar is an important source of international scientific information.

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**Figure: General search on Google Scholar**

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**Figure: Document-type-focused search on Google Scholar**

---

**Figure: Site-focused search on Google Scholar**

---
7.5 Selected Web 2.0 utilitie: photo mapping and sharing

There are many user generated and social networking sites on the Web. We only present two selected image hosting utilities for photo mapping (Panoramio) and photo sharing (Flickr) which can be an efficient tool to present agriculture-related events and geographical areas and sites.

Panoramio / Google Earth

Figure: Mapping of photo information on Google Earth - Panoramio-A

It is possible to present to international public one's institution or positions of research fields; registration is free

Figure: Mapping of photo information on Google Earth - Panoramio-B
Flickr

It is possible to present meetings and publish photos with freely available tools

Figure: Sharing of photo information on FLICKR-A
8 Agricultural technical and general information

8.1 Standards (ISO)

ISO - International Organization for Standardization
http://www.iso.org/iso/home.htm

International Organization for Standardization (ISO) is the world’s principal developer and publisher of International Standards.

ISO Standards are an important source of technical information

Full text can also be searched but can not be accessed for free

Figure: Search for standards and/or projects by Advanced search-A

Boolean search rules apply

Figure: Search for standards and/or projects by Advanced search-B
Standards can be searched by Classification codes

Figure: Search for ISO standards by ICS (classified by subject in accordance with the International Classification for Standards)

Standards can also be searched by Technical Committee codes

Figure: Search for ISO standards by TC (sorted according to the ISO technical committee responsible for the preparation and/or maintenance of the standards).
8.2 Patents (WIPO)

WIPO - World Intellectual Property Organization
http://www.wipo.int/portal/index.html.en

The World Intellectual Property Organization (WIPO) is a specialized agency of the United Nations. It is dedicated to developing a balanced and accessible international intellectual property (IP) system.

![Figure: Wipo IP (intellectual property) databases](image)

WIPO Webpage offers information also in Russian language

![Figure: Wipo - a possibility of Russian-language application](image)
There exist different categories of Intellectual Property, such as Trademarks or Patents.
8.3 **Statistics (Eurostat)**

Eurostat - by the European Commission

http://epp.eurostat.ec.europa.eu/portal/page/portal/eurostat/home

Eurostat is the Statistical Office of the European Communities situated in Luxembourg. Its task is to provide the European Union with statistics at European level that enable comparisons between countries and regions.

**Registration to Eurostat is free**

**Figure: Eurostat - free registration for better access**

**Figure: Eurostat - search for publications and datasets**

**Eurostat yearbook is a selection of statistical data on Europe, covering period 1996 onwards, including many data provided by candidate countries, Japan and the USA**

**Figure: Eurostat yearbook (freely downloadable PDF)**
Statistical data are available in different files

Some apricot statistics

It is possible to browse through a classification tree

Selected agricultural statistics

Figure: Eurostat - Statistics - Browse/Search databases

Figure: Eurostat - Statistics - some selected agricultural datasets
8.4 Legislation (EUR-Lex)

EUR-Lex - by European Commission

EUR-Lex provides direct free access to European Union law. Here you can consult the Official Journal of the European Union as well as the treaties, legislation, case-law and legislative proposals. You can also use the extensive search facilities available on EUR-Lex.

Search using search terms

<table>
<thead>
<tr>
<th>Search for</th>
<th>Guidelines for good results</th>
</tr>
</thead>
<tbody>
<tr>
<td>pollut*</td>
<td>To widen the search for a word, use the tilde (~) character. The ~ replaces 0 to 2 characters at the end of the word and is a wild card. Example: transport will find transport, transportations etc.</td>
</tr>
<tr>
<td>WITH agric*</td>
<td>A search term can be a single letter. Example: transport, energy, EU etc.</td>
</tr>
<tr>
<td>EXCEPT</td>
<td>Use a comma (,) between terms to search for documents containing at least one of the two terms separated by the comma. Example: transport, energy, EU etc.</td>
</tr>
<tr>
<td></td>
<td>Use WITH to restrict the search to document titles specified.</td>
</tr>
<tr>
<td></td>
<td>Use EXCEPT to search for documents not containing the terms specified.</td>
</tr>
<tr>
<td>Options</td>
<td></td>
</tr>
<tr>
<td>Title (search limited to document titles)</td>
<td></td>
</tr>
<tr>
<td>Title and text (full-text search)</td>
<td></td>
</tr>
</tbody>
</table>

Figure: EUR-lex - Simple search for document title terms

Bibliographic information on legislation data

Figure: EUR-lex - Bibliographic display of documents
Advanced search is rather complex
No truncation with a wild card is needed

Figure: EUR-lex - Advanced search for subject matter

Search: 1-10/5370

Available formats
Available languages (ISO codes)

Figure: EUR-lex - Bibliographic display of documents (5370) regarding vegetables