

## Plants on the Web - Accelerating the taxonomic workflow, integrating distributed information and presenting dynamic monographs

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A truly immense amount of information on the living organisms of our planet has been accumulated over centuries and is growing faster than ever before. There is a wealth of scientific literature distributed in libraries, vast specimen collections in natural history museums and universities around the world, and all kinds of biodiversity-related databases, many of them now searchable on-line. Many recent initiatives are trying to bundle at least parts of these data masses and make the information in these scattered resources easily available to the scientific community and to a wide public audience. These activities reflect an increasing need for society to have access to comprehensive, expert-driven, authoritative information systems on the earth's biodiversity.

Within workpackage 6 of EDIT, three teams have tried to assemble the existing taxonomic knowledge of exemplar groups of organisms in one place and to disseminate this knowledge via on-line data portals. In close co-operation with the developers of the Internet Platform for Cybertaxonomy (EDIT workpackage 5), they also explored the possibility of changing the way taxonomic work is done. A variety of IT tools now enables taxonomists to do a large part of their work in an integrated, virtual environment that greatly speeds up their working procedures, from fieldwork to publication of the results. These tools also facilitate fast and direct cooperation between people working on the same organisms.

Two of the EDIT exemplar groups focused on plants, one on the palm family (Arecaceae or Palmae) with one hundred eighty three genera and ca. two thousand four hundred species, and the other one on the Cichorieae (the lettuce tribe of Asteraceae or Compositae, the sunflower family), with ninety three genera and over two thousand four hundred species plus ca. seven thousand three hundred apomictic and hybrid taxa. Both exemplar groups have built internet data portals - Palmweb and the Ci-

chorieae Portal. Palmweb has capitalised upon a large amount of existing literature, notably a full checklist of the family, and a well-organised expert community in Europe. In contrast, the Cichorieae Portal was created as a part of an entirely new initiative, the International Cichorieae Network (ICN). Starting from very different points of departure, the teams were well placed to test if the Platform for Cybertaxonomy could fulfil the different user needs, represented by the exemplar groups. At the same time, definition of requirements and continuous feedback from the user groups greatly helped the EDIT developer team in creating and improving their products.

Palms are among the most charismatic and recognisable plants in the world and are emblematic of the tropics. The family holds several botanical records such as the longest leaf and heaviest seed, and includes some of the most economically valuable plants in the world. They provide an immense diversity of resources to people across the economic spectrum, providing essential means of subsistence to some of the poorest rural communities as well as valuable international commodities. Because of the value of palm products and the vulnerability of the tropical forest ecosystems they most frequently inhabit, very many palms are threatened with extinction.

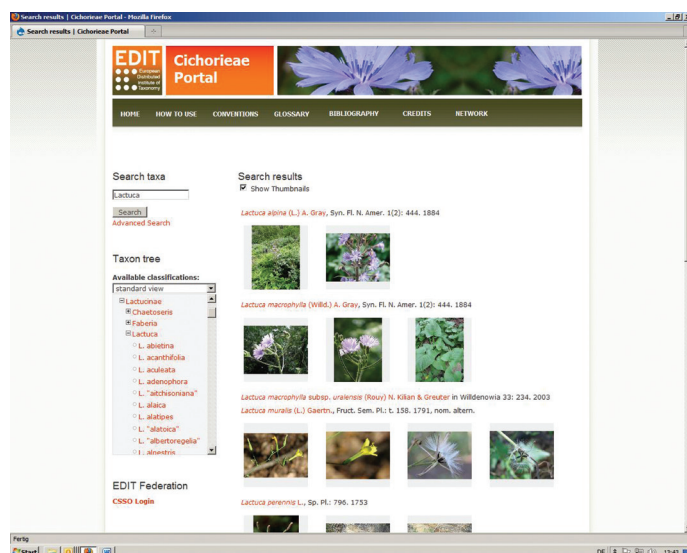


Fig. 1. Screen shot of the Cichorieae Portal

Palmweb is a growing on-line encyclopaedia for all the world's palms. Taxon pages with maps exist for all species and genera, and around half of these are fully populated with detailed descriptive content already. Links to original literature in which names were published are available for

sixty percent of all accepted taxa and around three thousand images are already accessible. Interactive keys to genera and an on-line glossary help to improve accessibility to a wide range of users.

Cichorieae, as a subgroup of the sunflower family, have a truly worldwide distribution - they can be found literally everywhere but Antarctica. They inhabit all climatic zones, with a focus on the mediterranean and temperate zones, but less representatives in the tropics. Their altitudinal level ranges from near sea level to the high alpine zones of all mountain systems of the world; and even in the arctic tundras a considerable diversity of dandelion species colours the ground. Cichorieae have few, but well-known economically relevant species: lettuce and chicory are important vegetables in many parts of the world. A few of them are invasive weeds in some parts of the world. Their flowerheads are very often bright yellow with ligulate flowers of the dandelion type, and many people will call most of them with this popular name - probably not being aware that there are hundreds of microspecies of dandelion alone!

The Cichorieae Portal displays today the first on-line monograph of the Cichorieae. It provides a geographically referenced species inventory of the entire tribe and assembles the information from all recent national or regional checklists or floras of the world, and of all major monographs that have been published so far.

The databases underlying the Palmweb and Cichorieae Portal follow the so-called Common Data Model (CDM), the core of the Internet Platform for Cybertaxonomy. With the help of a newly developed Taxonomic Editor, all data in the CDM can be directly managed by any expert who has access to it. Any new information - editing of existing data or addition of new data or images - becomes available on-line within seconds after editing. For instance, information such as a new record of an invasive species in a certain country will be visualised immediately in the corresponding on-line distribution map. The data portals also serve as digital image repositories, which makes it possible to link images to taxonomic data. In the long run, the data portals aim at presenting an constantly up-dated encyclopaedic knowledge base of their groups, with interactive keys to allow easy identification of its members, and specimen-based distribution maps.

The extensive testing of the Internet Platform for Cybertaxonomy by the exemplar groups has shown that these tools are well suited for a wide range of applications in the field of taxonomy and biodiversity research. They can be used

by anyone to create and present taxonomic monographs, checklists at any scale, image repositories or even electronic floras (see the EDIT Success Story "Using the EDIT Platform for Cyber-taxonomy to elaborate and disseminate complex floristic information" by Kirchhoff et al.).

## FACT BOX

The International Cichorieae Network (ICN) – an initiative towards a web-distributed revision of the Cichorieae

<http://wp6-cichorieae.e-taxonomy.eu/portal/>

Contact: Cichorieae Team at the Berlin Botanic Garden and Botanical Museum, Free University of Berlin, Germany ([n.kilian@bgbm.org](mailto:n.kilian@bgbm.org))

Palmweb: Palms of the world online

<http://www.palmweb.org/>

Contact: Palmweb Team at the Royal Botanic Gardens Kew, U.K. ([w.baker@kew.org](mailto:w.baker@kew.org))

### The Cichorieae Portal and Palmweb provide:

- **search tools**
- **browsable taxonomic trees**
- **accepted names and synonyms with literature citations**
- **protologues (first descriptions)**
- **type information**
- **common names**
- **morphological descriptions**
- **ecology**
- **uses**
- **distribution maps**
- **image galleries**
- **glossaries**
- **background information on systematics**
- **bibliography**
- **credits to all contributors**