

VoLE (Viewer of Life in EOL), a hierarchical treemap visualization tool for biodiversity images and data.

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Visualization tools that make use of the underlying hierarchical framework in large biodiversity image and data repositories can help scientists uncover large-scale patterns in evolution, are a compelling way for public audiences to browse information, and provide an engaging platform for data curators. Here we present VoLE, a visual tree browser that navigates the entire tree of life using Encyclopedia of Life web services. VoLE displays any classification tree available from EOL (e.g., NCBI, Catalogue of Life) with images and text served from the many data partners that EOL integrates. VoLE typically begins at the root of life and interactively leads the user up the tree. The visualization uses a space-filling squarified treemap layout, showing the taxon name and a representative highly-ranked image from EOL. As the user passes the mouse over the page, introductory species information from the EOL is displayed. Clicking on the name of a taxon takes the user out to the EOL page for that taxon. Clicking on the image or square for a taxon takes the user up that branch of the tree, redrawing the treemap with all the children of that taxon, with a breadcrumb trail displayed at the top of the page to show the context of the current level of the hierarchy.

We have designed VoLE with three primary audiences in mind. Public users can rapidly browse the images served by EOL, with the evolutionary hierarchy built in as a teaching tool for a broad range of audiences. Expert users and EOL curators have found that VoLE serves as an efficient curation tool to quickly identify mis-classified images or EOL pages that lack general species descriptions. Scientific users searching for hierarchical patterns in taxonomy or evolution will also be able to use VoLE. As the EOL adds new APIs, VoLE will be able to replace the images with more detailed data sets from the EOL. For example, the map could show primary data fields such as species richness indices for clades, body size, color, or other characters, IUCN red list status, the popularity of species pages or the types of content available for each species in EOL. In addition, other kinds of tree layouts such as the SpaceTree phylogenetic visualization can be offered using the same code libraries. VoLE is an initial step in the integration of large complex phylogenetic tree topologies with rapidly growing biodiversity databases in an effort to provide tools for a wide range of audiences that can visualize biodiversity data through a phylogenetic lens.

VoLE is written in javascript, HTML and CSS, and is compatible with all major modern web browsers. The treemap container layout is performed by the Javascript Infovis Toolkit (thejit.org), and the popular jQuery library ([jQuery.com](http://jquery.com)) is used for cross-browser DOM traversal and manipulation. VoLE uses the JSONP version of the EOL API, which allows it to make cross-domain AJAX requests, so it can be hosted on any web server or your local machine. The GPL-licensed source code is available at <http://github.com/kurie/EOL-tree-viewer> and the latest version of the app is hosted at <http://kurie.github.com/EOL-tree-viewer>. The taxonomies, images and text content are provided by EOL content partners through the Encyclopedia of Life API (eol.org). Supported by the John D. and Catherine T. MacArthur Foundation funding of the Encyclopedia of Life and the Harris Family Foundation.