On-line e-flora for Karaikal district, Puducherry, India

E-floras are aimed at providing comprehensive information on our wild plants for use in education, conservation and research[1–6]. Here, the gathered data from exploration surveys are easily made available to users. It is a computer-based program, including digital images and searchable descriptions based on floral information in an organized format. Through a web interface to the data, users can also browse on-line floristic data by family, genus, species, common name and related information. District floras are often considered as a basis for compilation of regional and national floras. Systematic approaches towards cataloguing the plant species at district level using standard digital formats are few. In this context, e-flora of Karaikal district, Puducherry, India is prepared as a comprehensive inventory of plant species with an interactive identification facility of all known plants of the district. It is a simple web tool which is highly useful to biologists as well as non-biologists for easy identification.

The e-flora was prepared based on detailed floristic survey in the district for five years (2010–14). The on-line version of e-flora of Karaikal district (http://www.eflorakkl.in) was developed using MS-Windows operating system, Apache web server, MySQL database system, PHP and Java script. Dynamic and interactive web pages were prepared using PHP. The website has three major modules: general information about the flora of Karaikal district, simple search, and advanced search of taxa. The information module provides the introduction, climate, river system, geology, methodology of e-flora and floral composition in the district. The simple-search module provides the facility to search species in a structured manner (Figure 1).

Users can search the plant species by family and genus in the dropdown list. They may also query the database by name, habit, habitat, locality, and local or vernacular names (Figure 2). As a result of search sequence, the species page containing taxonomic descriptions of the species, digital images and distribution maps, local vernacular names will be displayed (Figure 3). An image gallery is provided to recognize the species, which includes multiple images of live specimens and their habit, leaves, flowers and inflorescence. Scanned herbarium images of most of the species are also captured and made available in the species pages. Interactive key module allows the user to search the unknown species in a more flexible manner. Habit, leaf arrangement, leaf form, leaf apex, leaf base, leaf margin, petiole, stipule, flower colour and habitat are used as search fields in the interactive key module.

The user can select and click any family from the dropdown list of families; the genera list related to the selected family will be appeared in the next column. If a user selects the genus by clicking from the genera list, species list will be presented in the adjacent column. The user can select species from the list and click 'OK' button; then species page will appear on a separate screen. The species page displays plant name, family, local name, habit, habitat, distribution of the species in the district, threat status, flowering and fruiting time in separate columns. The page also displays detailed taxonomic description, digital images of live and herbarium specimens, and species distribution map of the district. Images of the species are displayed in three groups, namely habit and leaves,

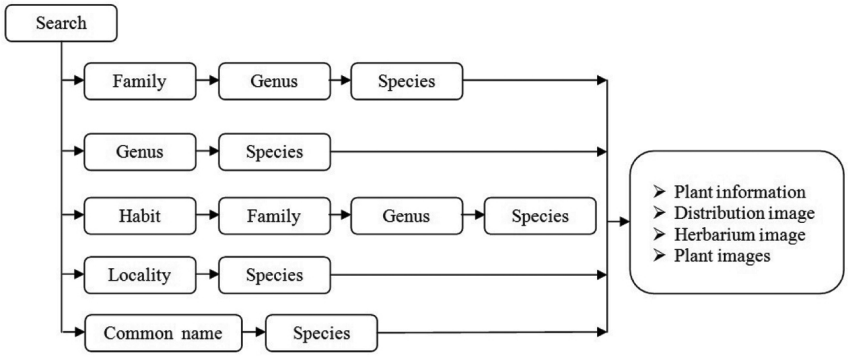

Figure 1. Search modules in the e-flora of Karaikal district, Puducherry, India.

Figure 2. Home page of e-flora of Karaikal district.

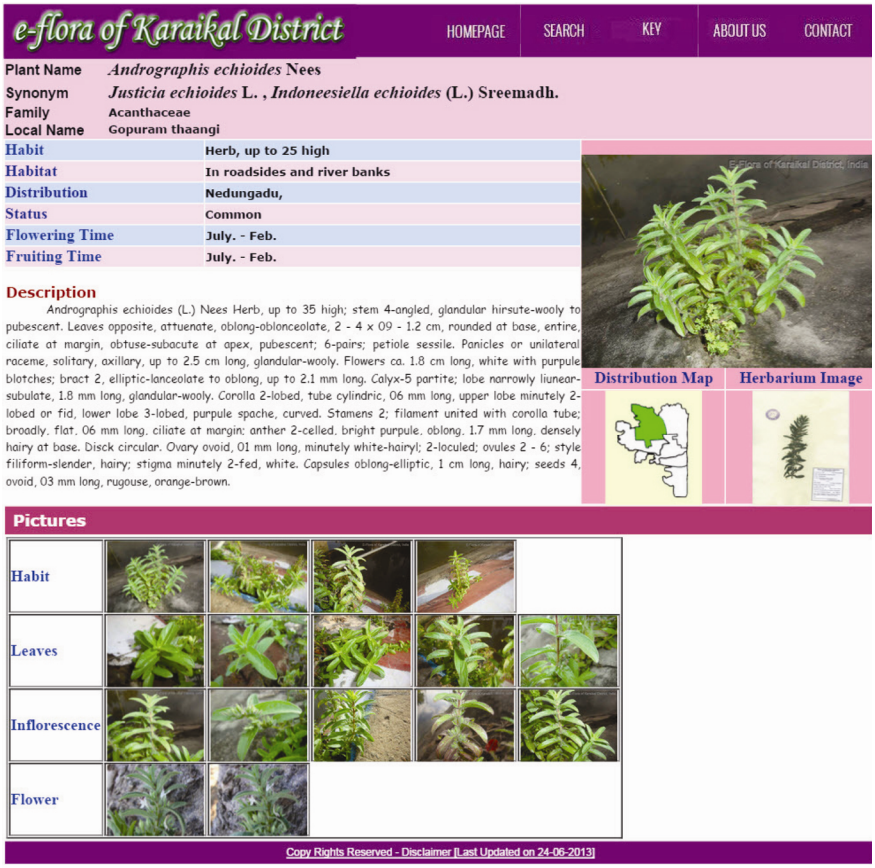

Figure 3. A sample species page in e-flora.

inflorescence and flowers, and herbarium specimens. Each group contains multiple images with enlargement options available for identification of the plant species.

Interactive identification key is included in the software for identification of plant species using images. Easily observable characters even by the non-taxonomists, such as habit, leaf arrangement, leaf form, leaf apex, leaf base, leaf margin, petiole, stipule, flower colour and habitat are used in the identification key. Each group has a dropdown list of characters, displayed in the form of photographs or text on the right-hand side panel of the character list. This facilitates the user to select the appropriate character of the unidentified plant from the dropdown list. Based on the character selection, 'search results' panel displays the results of the selection process by list of the species. Characters can be selected in any order. Generally, few characters are enough for identification of plants. Sometimes, the list provides two or more plants in the 'search results' panel. In this case, the user must click each one of the species to go to the species page from which identification can be made.

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