



CONTRIBUTING TO BIODIVERSITY TAKES THE GEOWEB ROUTE

Going green generally means practicing an ecologically responsible lifestyle and decision making which can help protect the environment and sustain its natural resources for current and future generations. If actions such as turning off lights and electronics when not in use or opting for products made from recycled materials appear economically and environmentally self evident, the benefits of choosing right species for greening home gardens or residential landscapes are often less apparent especially for generations grown-up in places that have been stripped from native vegetation. Indeed, in a context of increasing extension of urban landscapes, residential and development areas still contain a significant proportion of specific biodiversity that can be managed for the valuation of cultural heritage, economic development as well as for the restoration of threatened species occurring outside the network of protected areas. In these circumstances, collective knowledge about the value, specificity and ecology of surrounding fauna and flora becomes crucial since individual and collective decisions that will be made during the next decade are likely to shape for a long period, if not indefinitely, the services that will be possible to benefit from. Recently, collaborative Web tools handling geographic data have shown a great potential for gathering and sharing biodiversity data. This approach has been started and exemplified by the development of citizen sciences Web platforms involving individual volunteers or networks of volunteers in different projects including bird nest watching or the San Francisco urban map project where citizen contribute mapping and measuring San Francisco's urban trees on a website (<http://www.urbanforestmap.org/>).

Contributing to collective knowledge of landscape forest biodiversity

In Malaysia, any citizen can currently support public awareness on residential forest biodiversity by identifying trees and entering them in a spatial database designed at INTROP-UPM. This database which is open to the public is at present accessible through the "Pericopsis" Web portal at <http://pericopsis.org/>. Tree distributions can be visualized on a Google map and accessed through basic GIS functions which are able to filter geographic distributions and tree species. Pericopsis.org is designed on the principle of a "Wiki" and users can edit and change contributions of each other if they think they are inaccurate. Besides, the database developed at INTROP is planned to be interoperable with web portals of public and professional organisations desiring to build and share their own spatial databases on tree locations UPM campus tree name and locations collected by UPM Agribio Resources Division are for example will be made accessible through both Pericopsis.org and UPM Web portals in the near future.

If successful, a large and freely accessible database of tree locations updated by multiple stakeholders will be both an educational tool and an evidence-based support for planning and coordinating decisions for forest biodiversity management at scales that integrate local ecologic functions. By making spatial relationships more apparent, collaborative GIS web portals may shift preferences for only locally rewarding management decisions that bring long term benefits for natural resources and to the overall appreciation of the community. As illustration, the use of exotic trees in urban forestry or private gardens may locally increase diversity and constitute a rational choice since their adaptability, flowering and architectural patterns are well known. Nevertheless, their impact on diversity maybe adverse on a global scale when exotics do not integrate functions of local ecosystem, interrupt corridors between protection areas and contribute to the loss of cultural identities.

Getting involved on pericopsis.org

As on most Web 2.0 portals entering data requires the user to be registered with a specific and password protected identification name. The identification name will be associated to entered tree locations and tree names, edited tree names and personal area of survey delimited by a polygon drawn on a Google map. A personal area of survey permits you to rapidly find back an area of interest and to share it with other users. It also allows for possible changes made by other contributors or to rapidly detect possible acts of vandalism. Recording an area of survey is straight forward:

1. After signing-in and accessing the contribution page at (<http://pericopsis.org/trees/enginposition.php>), draw a yellow polygon over your area of interest such as your home garden by clicking directly on the Google map (*Figure 1*). If needed, the polygon can be erased by clicking on the "clear map" button and drawn again.



Figure 1. Polygon drawn by clicking on the map

Tree position

Go to

Polygon
Lat: 3.006555
Lng: 101.665055
Km²: 0.020

Figure 2. Form for recording polygons



Figure 3. Two recorded polygons

2. Click on the word "Polygon" and the buttons "Show" and "Record" will appear (*Figure 2*). Pressing "Record" will record the drawn polygon under your identification name and pressing "Show" will show in red any recorded polygon that is within the yellow polygon (*Figure 3*).



Recording a new tree

The location of a new tree is indicated by moving on the map a red symbol (Figure 4) that appears after pressing the "New tree" button. Once the red symbol is on the desired position and no other tree is on the same place, click on the "Check" button and a green tick sign should appear. Recording a tree you to assign a scientific name. The form for scientific names is displayed by clicking on "Scientific name". On the form, select a name level, enter the corresponding name part and click on "Check" to verify if the name exists in the Pericopsis database (Figure 5). If yes, a green tick should appear. If not, you need first to enter your name in the database.



Figure 4. Symbol indicating new tree position.

Level	Name	
Species	mangium	Check

Figure 5. Example: checking if *Acacia mangium* is in the database

Entering a new "scientific" name in the database

Pericopsis is a Wiki and its database is empty at the origin. New scientific tree names need to be validated before being accepted. If the name does not exist in the Pericopsis database, it needs to be validated using the ©International Plant Name Index (INPI) database that becomes accessible by clicking "Check INPI" (Figure 6). Intraspecific names are handled on the same principle as the species name and validated by the IPNI database. Epithets **subsp.**, **var.** and **f.** that distinguish respectively subspecies, varieties and forma are selected following an query on a infraspecific name if epithet has not been chosen.

If there is no botanical name for a hybrid, a second name can be associated by checking the radio button "(x) Hybrid" in the "Scientific name" form. The radio button "(+) Grafting" is used when the double name is related to a chimera.

Cultivars or cultivated varieties do not follow the system of botanical naming and are not available in the IPNI database. New cultivars need to be entered with an internet link that gives some information about them. The form for cultivars is obtained by clicking on "Infra-specific" in the IPNI form. The species and genera corresponding to the cultivar need to be validated again in the I P N I window even if they already exist in the Pericopsis database.

Level	Name	
Species	leprosula	IPNI © validation
©International Plant Name Index		
Genera	Species	Infra-specific
Shorea	leprosula	
Check IPNI © database <input checked="" type="checkbox"/> DIPTEROCARPACEAE Shorea leprosula		

Figure 6. Example where *Shorea leprosula* is not in the database. The name is entered using the International plant Name Index form.

Validation of a new tree

Other entries such as "Common name", "Evaluation" and "Comment", are optional. Clicking on the title shows and hides the corresponding forms. For the Diameter at breast height (DBH) value, the tree circumference instead of diameter can be entered after clicking on "Diameter at breast height (DBH)". Comments are limited to 300 words. The common names need to be associated to a country where they are in usage. The button "Validate" can only be pressed tree scientific name and position are given and confirmed by green ticks.



Rhaps excelsa – Serdang Palm – Southern China and Taiwan

Editing existing trees

Alstonia angustifolia – Pulau – Southeast Asia

All attributes except tree locations can be edited. For editing, click "Edit tree". Changes will only take into account the forms that have been checked. Trees to be edited should be selected on the map as a white marker. Changes are validated using Validate. Successful validation is confirmed by a green tick and can be checked by reloading the trees on the map. Editing also permits removed of cut trees by marking them as dead under "Evaluation" and to correct possible vandalism. Trees marked as dead will be automatically be removed from the database after a few days.

