

Study of the school trees Biodiversity

Translated from French to English by Jean Weber after:

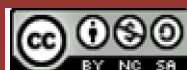
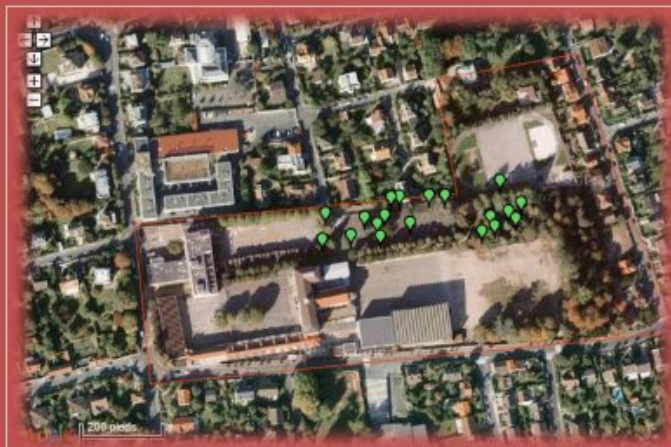
Etude de la biodiversité des arbres
de l'établissement
Dossier pédagogique

N. Lepouder

<http://pericopsis.org/trees/lepouder.pdf>



2011/2012



p.1 to 9 : Planning of the sequences 1 to 3.

p.10 and 11 : Capacities

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P.13: Practical sheet

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**p.16 and 18 : Methodological sheet : creating a scale
with Mesurim**

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**p.22 : Methodological sheet : geo-localizing a tree
using Pericopsis**



STUDY OF THE SCHOOL TREES BIODIVERSITY

Grade : 10th

Field of knowledge :

Theme : The earth in the universe, Life and the evolution of the living : an inhabited planet.

Subtopic: The biodiversity, result and step of the evolution.

The biodiversity, result and stage of the evolution	
<p>The biodiversity is both the diversity of the ecosystems, the diversity of the species and the genetic diversity within the species.</p> <p>The current state of biodiversity is a step in the history of life: current species represent a tiny part of the all the species that existed since the beginnings of life.</p> <p>The biodiversity is modified in the course of time under the effect of numerous factors, including human activity.</p> <p>Objectives and key words. The notion of biodiversity is enriched on the occasion of a sortie or a lab work.</p> <p>(Junior High school. Determining living species, first approach of the biodiversity, ancient biodiversities). [Limits. The ecosystem is only defined as an ensemble made of an environment and its living inhabitants]</p>	<p>Handling, gathering and organizing information, if possible on the field for:</p> <ul style="list-style-type: none"> - to find diverse aspects of biodiversity in a given situation - to reveal the influence of Man on the biodiversity <p>Using simplified tools for plant or animal species determination (current or fossils) to reveal the biodiversity of an environment.</p> <p>Becoming aware of human responsibility against the environment and the living world.</p>

- Objectives of knowledge:

- Diversity of tree species within an ecosystem (the school park).
- Modification of the biodiversity as an effect of Man's action.

- Objectives of methods:

- Handling, gathering and organizing information on the field:
 - to find diverse aspects of biodiversity in a given situation
 - to reveal the influence of Man on biodiversity
- Using simple identification tools for tree species (Simplified identification keys of the French National Forest Office, ONF) to identify a species by developing observation skills and to reveal the biodiversity of the environment.
- Using software to measure trees, to resize pictures , to capture information in a word processor (after research on Internet) in order to realize an identification card of the studied tree, to geo-localize the studied tree using the functionalities of the Pericopsis website (<http://pericopsis.org/>).
- Appreciating human responsibility towards the environment and living world. Developing critical awareness.

Problematic: what are the trees species present in the studied environment? How to identify them? What indicates Man's action in this environment, what are their possible consequences?

The activity took place on two sessions of 1.5 hours and a final session of 30 minutes.

Session 1 (1.5 hour):

Objective : estimating the number of tree species of the ecosystem, identifying a tree, making observations, making measurements and photographs.

At first, a half group (17 to 18 students) visited the whole school park with the instruction of estimating the number of tree species present.



Polygon of the School Park St Laurent-LPND (Seine et Marne, 77 - France)

Some students made an estimation of several dozen species, impressed by the volume of trees, other evaluated only a few species as they have focused on large observed groups (many linden and sycamores, at this stage the different Pinophytes were not recognized). Quickly it appeared to the student that some trees were belonging to a natural population resulting from seed dissemination and that other were planted (alignments of the trees, choice of species).

Teams of 3 to 5 students have been made. Each had a camera, a measuring tape, notebooks and bags for sample collection.



Each group has been appointed for the determination of a tree that was identified with the help of the identification keys of the French National Forest Office (ONF, coniferous and broad-leaved trees). They were informed that some trees could not be found in the key and that they should report to the teacher if the tree wasn't fitting with the identification characters (this was for example the case for the Judas tree).

They realized numerous pictures including one with a student of known size standing at the foot of the tree for further estimation of the tree height. They made measurements (leaves, circumference at breast height) and collected samples (leaves, fruits, seeds, bark).

Returning to the lab, some completed their observations by opening the fruits to observe the seeds ... some students made photographs of leaves, fruits or seeds on graduated paper to render the size of their samples.

Session 2 (1.5 hour):

Objective : Making a tree identity card by :

- ✓ reporting observation on an identity card.
- ✓ determining the tree height
- ✓ resizing the pictures that have been made
- ✓ finding information on internet
- ✓ geo-localizing the tree within the school park

The activity was followed at the computer room with the realization of the tree identification cards. A matrix of tree card was in the students working space (tree-id-card.odt) to insure some uniformity in the presentation of the productions. Observations made in the park were entered and complementary information was collected on the internet. Photographs were resized and reframed with the software Photofiltre (document : photofiltre1.pdf), the tree size was estimated using the software Mesurim and creation of a scale (document : Mesurim.pdf). During the realization of the tree cards aspects of digital use and property rights were discussed: do not copy-paste, do not use pictures of a classmate without parental authorization or blurring of faces if appropriate. Indication of references when the copyright of pictures downloaded from internet could not be determined. Furthermore, the students geo-localized their tree on the Pericopsis website (document: geo-localizing a tree using Pericopsis.pdf) and appreciated the idea to collaborate knowing that Pericopsis aims:

- Giving a visibility to the knowledge of trees in urban and peri-urban areas.
- Integrating their work in a collaborative process contributing to the production of original knowledge.

The realized tree cards are published at the following addresses:

- 🌳 Judas tree : <http://www.calameo.com/read/000488060a7abe6a5244c>
- 🌳 Silver Birch : <http://svt6projet.free.fr/IMG/pdf/bouleau-blanc.pdf>
- 🌳 Atlas Cedar : <http://svt6projet.free.fr/IMG/pdf/cedre-bleu.pdf>
- 🌳 Blue Atlas Cedar : <http://svt6projet.free.fr/IMG/pdf/cedre-atlas.pdf>
- 🌳 False Cypress : <http://svt6projet.free.fr/IMG/pdf/cypres-sawara.pdf>
- 🌳 Sitka Spruce : <http://svt6projet.free.fr/IMG/pdf/epicea-sitka.pdf>
- 🌳 Maple Ash : <http://svt6projet.free.fr/IMG/pdf/erable-negundo.pdf>
- 🌳 Sycamore Maple : <http://svt6projet.free.fr/IMG/pdf/erable-sycomore.pdf>
- 🌳 Common Ash : <http://svt6projet.free.fr/IMG/pdf/frene-commun.pdf>
- 🌳 Holly : <http://svt6projet.free.fr/IMG/pdf/houx-commun.pdf>
- 🌳 Italian Black Poplar : <http://svt6projet.free.fr/IMG/pdf/peuplier-italie.pdf>
- 🌳 Eastern White Pine : <http://svt6projet.free.fr/IMG/pdf/pin-weymouth.pdf>
- 🌳 Black Pine : <http://www.calameo.com/read/0004880606e2809c2501e>
- 🌳 Cherry Plum : <http://svt6projet.free.fr/IMG/pdf/prunus.pdf>
- 🌳 Black Locust : <http://svt6projet.free.fr/IMG/pdf/robinier.pdf>
- 🌳 Babylon Willow : <http://svt6projet.free.fr/IMG/pdf/saule-pleureur.pdf>
- 🌳 Small-leaved Lime : <http://svt6projet.free.fr/IMG/pdf/tilleul-petites-feuilles.pdf>

Session 3 (30 minutes):

At the time of a third step, the students could observe the whole of the recorded trees by showing the perimeter of the study (connection to Pericopsis.org > thumbnail « consultation » > « Selection criteria » > « Area » > Polygon name: svt6 > « load » > « Show trees ») and it was reminded that all trees haven't been identified namely the Oriental Plane, the Horse-chestnut, the Himalayan Cedar, the Maidenhair tree, the European Yew, the common Hazel and the common Lime. The initial goal was reminded and it was asked to answer individually by writing a synthesis.

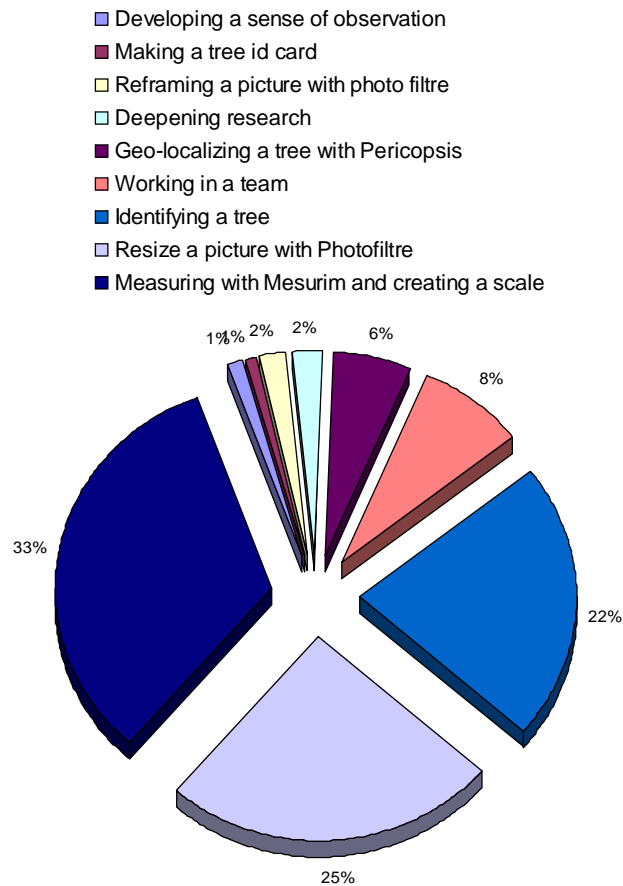
The majority of the students could reevaluate the number of species to 25 and giving examples. The trees identification criteria have been integrated: appearance of the bark, form and arrangement of the leaves ... They also well understood Man's action by observing the aligned plantations of the Lime alley, the introduction of non endemic species such as the Atlas Cedar, The Judas tree or the Saware Cypress... Concerning the consequences of man's actions they demonstrated critical awareness: some evoked risks of hybridization, risks of biodiversity loss by the introduction of invasive exotics (example of a herbaceous perennial plant observed during the first session: the Japanese knotweed introduced in France in 1939), the increased risks of allergy by the introduction of foreign species, the possibility of preserving species endangered in their country of origin, the failure to know the real appearance of the tree due to the regular pruning such as for the common Lime... Students were willing to share these thoughts that will be soon the subject of a personalized accompaniment activity.

At the end of the activity, two questions were asked:

- 1) What are the abilities you think have developed during this activity?
- 2) What has been for you the main motivation around this project?

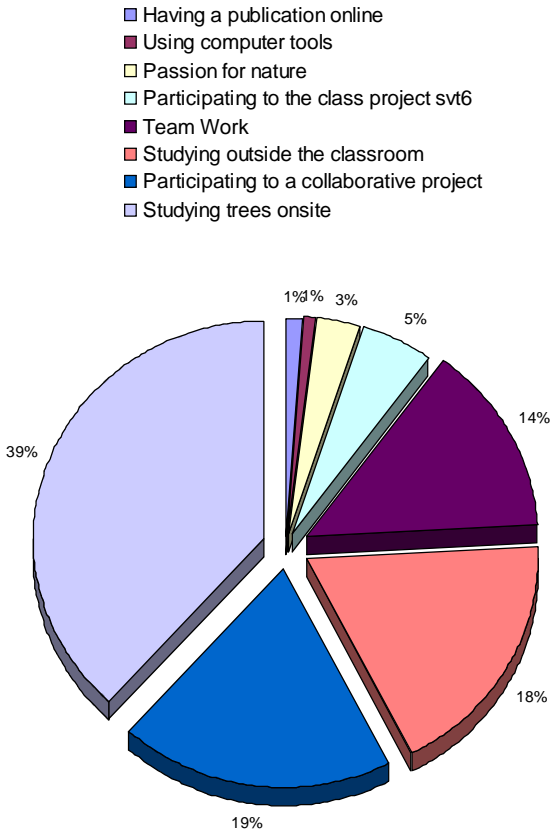
For the students the most developed capacities are the identification of the tree, the use of the Mesurim software for the making measurement using a given scale (some have planned reinvesting it quickly during a coming visit of a historic building), resizing a photography using the software of image processing.

DEVELOPPED CAPACITIES



Regarding the motivations, the first is studying trees onsite, participating to a collaborative project, studying outside of the classroom...

MOTIVATIONS



Observations :

During this activity, I noted that students were more invested by having the feeling of working in another way. They made efforts in writing working their language level and sleeked information seriously because they were conscious that their work will be published online. Some have chosen to indicate their name with the parental authorization other not. 5 among 39 were not authorized by their parents to publish their names or initials.

They were very interrogative in relation to Man's action towards the environment and these questions will be extended in one of the class where an initiation to debate will be lead in the frame of the personalized support activities.

Many have been very surprised discovering the netiquette (rights linked to the images, texts and precautions related to the identity) and understood why some WebPages take long time to load when the weight of the files is too big. They have also shown their intention to reinvest the developed abilities in other disciplines. They have increased their vocabulary and were pleased reusing it, particularly in geography where they worked at the same time on sustainable development.

Capacities trained during the activity:

Competence 3- Main elements of mathematics, scientific culture and technology

- Seeking, extracting and organizing information.
- Making measurements, applying instructions: measuring the circumference of the tree trunk at breast height, following a protocol ...
- Reasoning by exploiting results, observations
- Presenting the followed approach, communicating with adapted vocabulary whose scientific words are defined

Competence 6- Social and civic competences

- Respecting rules of collective life
- Being aware of its responsibility towards the environment (no trampling of young plants, reasonable sampling without tearing off....)

Competence 7- Autonomy and initiative

- Being autonomous in its work
- Being curious
- Developing a critical mind

Competence 1- Study of French language

To express by making correct sentences, respecting the spelling and grammar....

Competence 4 – Mastering common techniques of information and communication

1. Appropriation of a computer working environment

- Getting identified on the school network and closing the login process
- Accessing to software (mesurim, OpenOfficeorg writer, photofiltre) and documents on the personal storage space (Software help files in the class storage space, « tree-id-card.odt » in the student personal storage space).
- Reading file properties (size of the pictures).

2. Adopting an attitude of responsibility

- Protecting private life and considering the communication of personal information (approval for the publication of the student name in the liaison notebook).

- Using documents in respect to author's copyrights and ownership (no publication of students photographs without parental authorization or face blurring, indication of the document sources).
- Providing computer skills (How to reframe and resize photographs, blur faces, enter data on Pericopsis).

3. Creating, producing and making use of data

- Modifying a picture using a dedicated software (resize, reframe, using a filter).
- Making a measurement using a dedicated software (mesurim)
- Modifying a presentation pattern (text file matrix matrice) by including pictures, text, links that are not oversized.

4. Gathering information and material

Seeking for information on specialized websites (being able to identify the reliability of a website).

5. Communicating and sharing using information and communication technology - ICT.

- Sending a message with attached file (sending the tree id card to the teacher).
- Adapting the content of information to potential readers: level of language, shape, size

EVALUATION GRID FOR THE TREE CARD

ABILITIES	MARKING SCHEME	POINTS
Searching, extracting and organizing the information		
Common and latin names present and correctly spelt	0.5	
Tree form and height	1	
Circumference at breast height	0.5	
Leaves: forms and arrangement	1	
Longevity	1	
Flowering time	1	
Description of the flowers	1	
Description of the fruits, seeds, period of maturity, dispersing mode	2	
Origin and living environment	1	
Usage	1	
Bibli/Webography	1	
Tidiness originality	1	
Medias: creating, producing, using and processing photographs		
Resized photograph that not exceed 640 x 480 pixels	1	
Adopting a responsible attitude		
Photographs with caption and quotation of sources if external	1	
Autonomy		
Work finished at time and send by mail	1	
Mark/15		

PRACTICAL: STUDY OF THE SCHOOLS TREE BIODIVERSITY (weeks 1 and 2)

The school park has a large number of tree species. If some developed naturally by their own means of dissemination, many results from man's action with plantations ordered in space and the choice of species that not all belonging the studied area.

What are the species present in the studied environment? How to identify them? What indicates man action in this ecosystem and what are the possible consequences?

Material:

- simplified identification key of coniferous and broad-leaved trees (ONF) or application for android mobile phones:
http://www.onf.fr/activites_nature/@@display_advise.html?oid=IN00000013ee
- Numeric camera, Plastic bag, small notebook, pencil, graduated paper, measuring tape (5m)
- Computer station, mesurim software, OpenOffice software, Photofiltre software, file "tree-id-card.odt", instruction sheet "creating a scale with mesurim" and "Geolocalize a tree using Pericopsis".
- Access to Internet or at any document of the school library permitting to complete the information on the studied tree.

Activities and sequence of the operations	Abilities and evaluation criteria
1. Going around the park and estimate the number of different tree species that can be observed (1 to 10, a few dozens, a few hundreds).	Observing, inquiring
2. Following the protocol sheet and realize field and lab activities (measurements , photographs, collection, observations...) by sharing the tasks.	Following a protocol
3. Resizing the realized photographs at the format 640 x 480 pixels using the software photofiltre and estimate the tree size using the software Mesurim	Using a image processing software
4. Completing the file "tree-identity-card.odt" by seeking information on Internet (Latin name longevity...) and insert the realized photographs.	Seeking, extracting and organizing information
5. Geo-localize the tree in the area svt6 on the website "Pericopsis" using the corresponding information sheet.	Using a geolocalisation application
6. Answering to the stating problem by bringing together the information obtained during the previous researches and by observing the geo-located area completed by the different groups	Organizing information and applying an explanatory approach to answer the question that has been set Communicating with valid sentences and appropriate scientific vocabulary

Common name

(*Latin name*)

Description :

<p>-Size and form of the tree :</p> <p>-Diameter of the trunk measured at breast height :</p> <p>-Aspect, color of the bark :</p> <p>- Leaves :</p> <ul style="list-style-type: none"> • <i>arrangement</i> :alternate, opposite. • <i>Form</i>: simple, compound, toothed, size... <p>(Photography of the leaf, should not exceed 640 x 480 pixels</p> <p>-Longevity : (tree life span)</p>	<p>Photography of the tree, should not exceed 640 x 480 pixels</p>
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Reproduction :

- Flowering time :
- Description of the flowers : (*color, size, number of floral parts, presence of pollen*)

Photography of the flower	Photography of the pollen
Legend or adress of the source	Legend or adress of the source

-Description of fruits and seeds, maturity time and dispersal mode:

Photography of a fruit of a seed

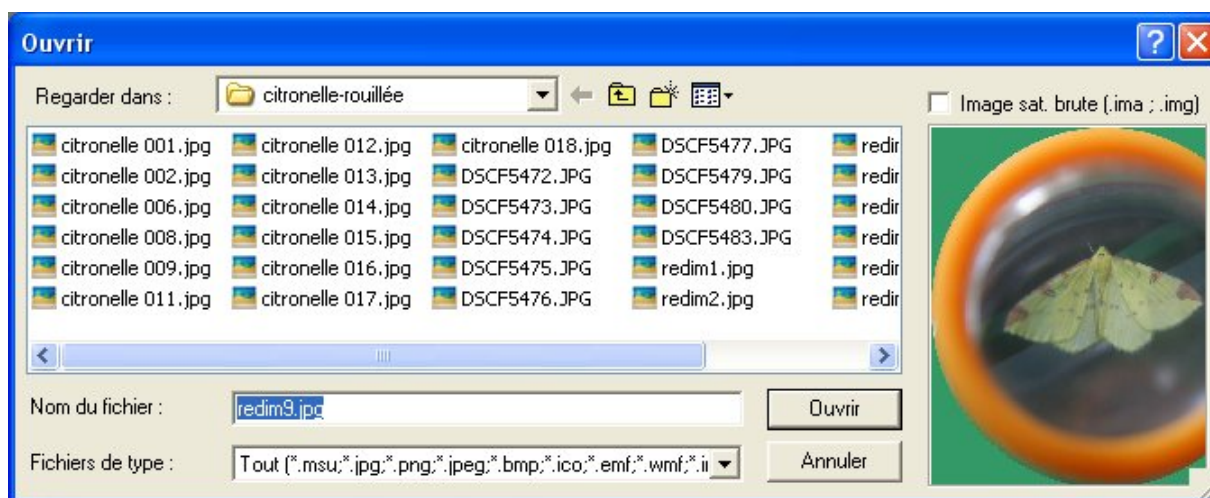
Living environment and origin

Utilization: (forestry, medicine, industry ...)

Bibliography, webography :

Creating a scale with MESURIM

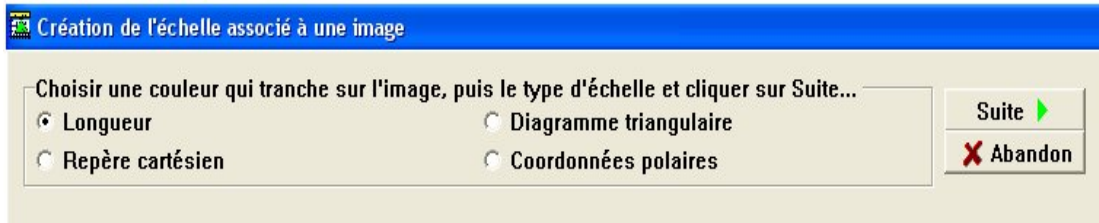
Seeking a picture for which one dimension is known by clicking on the menu bar then File → Open. Then select the picture where you want to do measurements.



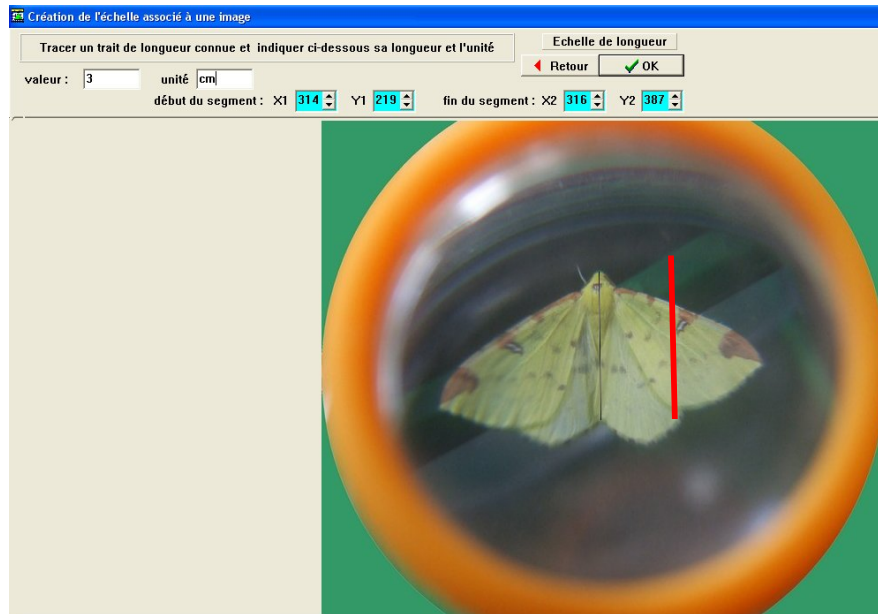
In the menu « Picture », select « Create/Modify scale ». Ticks « Scale to be defined » then click "OK".



The select « length » and click on « Continue ».



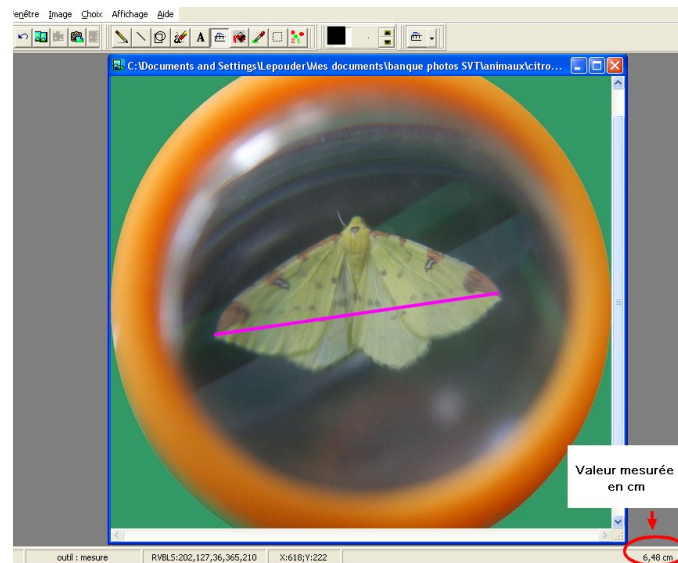
Draw then a line corresponding to the segment of known length. In the example hereafter, the segment measures 3 cm. Fill-in the length and the unit, then click « OK ».



If the measurement is occasional and the scale do not need to be recorded check « Do not keep in memory » than click on OK. Otherwise, fill-in an evocative name and record the scale.

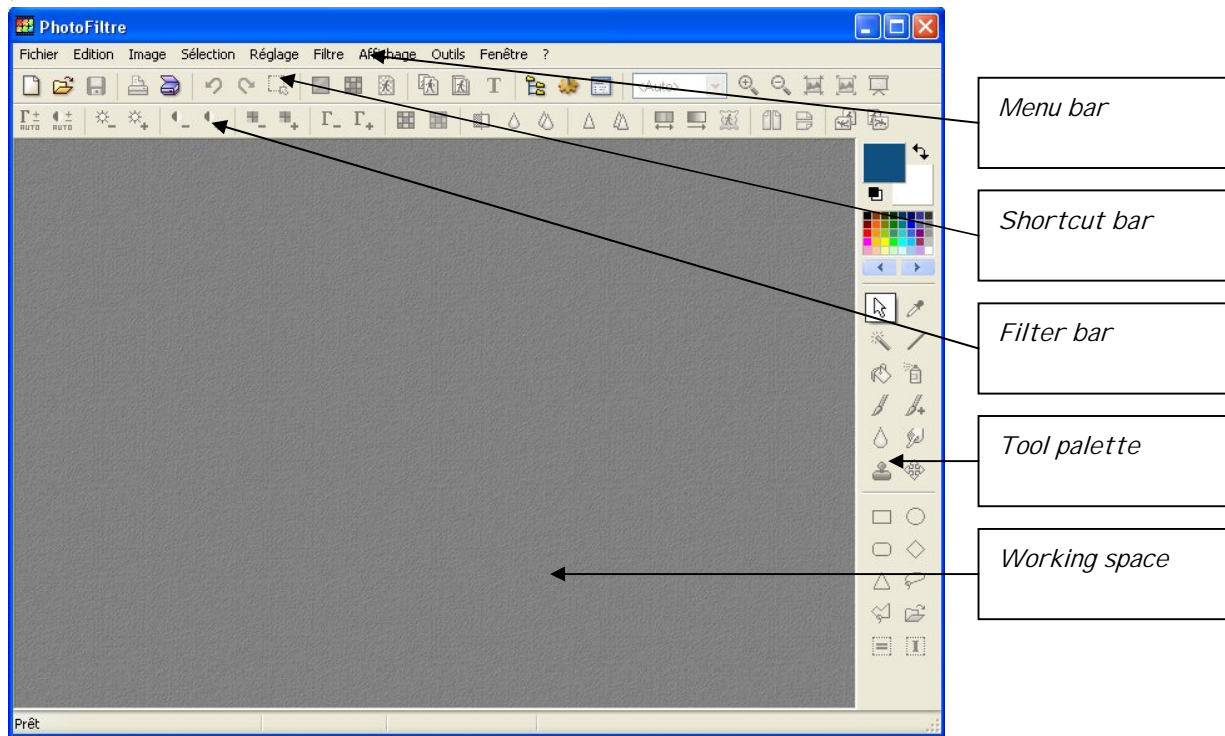


Tracer ensuite un trait sur le segment dont vous désirez connaître la mesure afin de déterminer sa valeur qui apparaîtra en bas de votre fenêtre sur la droite.



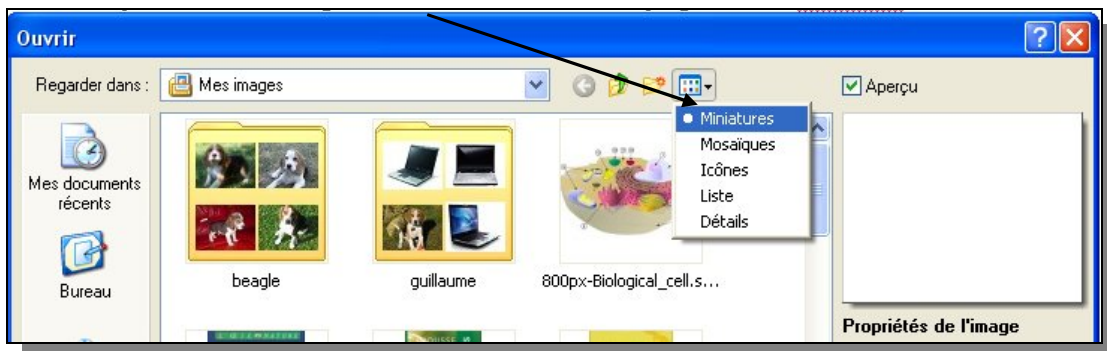
Utilization of PhotoFiltre

After having launched the software, menu start → all programmes → PhotoFiltre, you will see the working interface



1. Opening a picture.

Menu file → open then select the picture you desire using on the hardisk or any other support: USB thumbnail, CD etc. To find more easily your picture click on large icons.

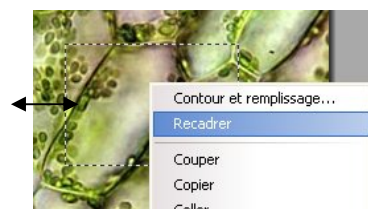


2. Resize a picture.

Click on the picture at the lower left angle of the subject you want to resize and maintain the left mouse button. In this manner you obtain a selection (dotted outline). You can modify the frame of your selection by diminishing its length or width : move the pointer on the basis of the frame or on one of its sides, you will see appearing a double arrow. Make a left mouse click and maintain the button pressed until you have the required size.

It's possible to move the selection frame by a left mouse click on its center and maintaining the button pressed.

Then, right click on the mouse and select « reframe ».



1. Modifying a picture.

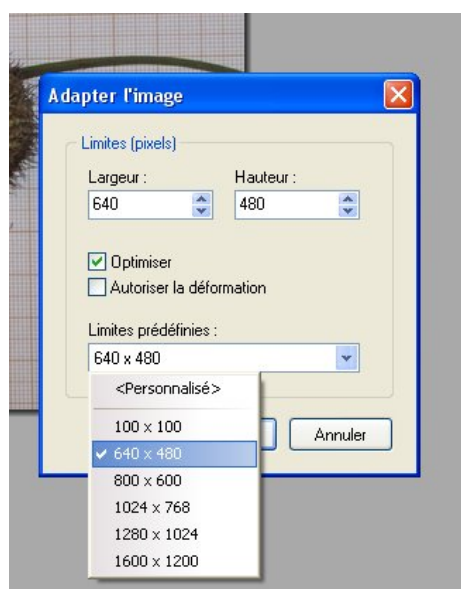
To insert a picture in an article published on the web, do not exceed a size of 640x480 pixels.

To modify the size :

-right click on the picture


-select « adapt the picture »...

-Click on the scroll of predefined sizes and select **640x480**



It's also possible modifying the picture size by selecting in the menu bar menus → picture → picture size...

4. Framing and shadowing the image border.

- To frame a Picture select in the menu bar menu → filter → frame then choose the desired effect. It's possible to reverse the effect by clicking on the red arrow .
- External shading : select in the menu bar menu → picture → external shading then select the position of the shade,, set the color, width, style...



5. Saving and printing:

- To save the picture, click on file → save under... (Select the target folder and name the file) → save.
- Print the picture, click on file → print then choose the centered presentation or real size.

Geo-localization of a tree with Pericopsis

1. Accessing to pericopsis

Entering in your browser the address: <http://pericopsis.org/> then click on “English”

2. Recording a tree:

After the teacher connected you to the school study area, click on “Contribution” and you will directly access to the schools study area.

a) Establishing the tree position

In the frame “tree map” click on “Next tree”. A red marker appears at the middle of the map. The maker needs to be placed on the tree’s exact position by visual recognition.

b) Information on the tree.

The tree requires being named by its Latin name and the information is entered in the frame “New tree” by clicking on “Scientific Name”

If the name isn’t in the Pericopsis database (initially empty), the name needs to be validated using the database of the ©International Plant Name Index (IPNI).

Enter the common name associated to the country where it’s in use, the naming evaluation (certain or not), the circumference at breast height by clicking on “diameter at breast height”, a comment (limited to 300 words) and, if possible, a link to a document or information relative to the tree.



Before validating call the teacher for checking. After validation the tree appears in form of a green marker.

3. Consultation of the area of study.

Connect to Pericopsis and click on “Consultation”. By clicking on the word “Area” in “selection criteria” 3 choices will appear. By completing the polygon name with “svt6” followed by a click on “load” the area of study will appear on the map. Click then on “Show tree” to show the recorded trees. A click on a green tree tag permits to show the recorded information associated to the tree.



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