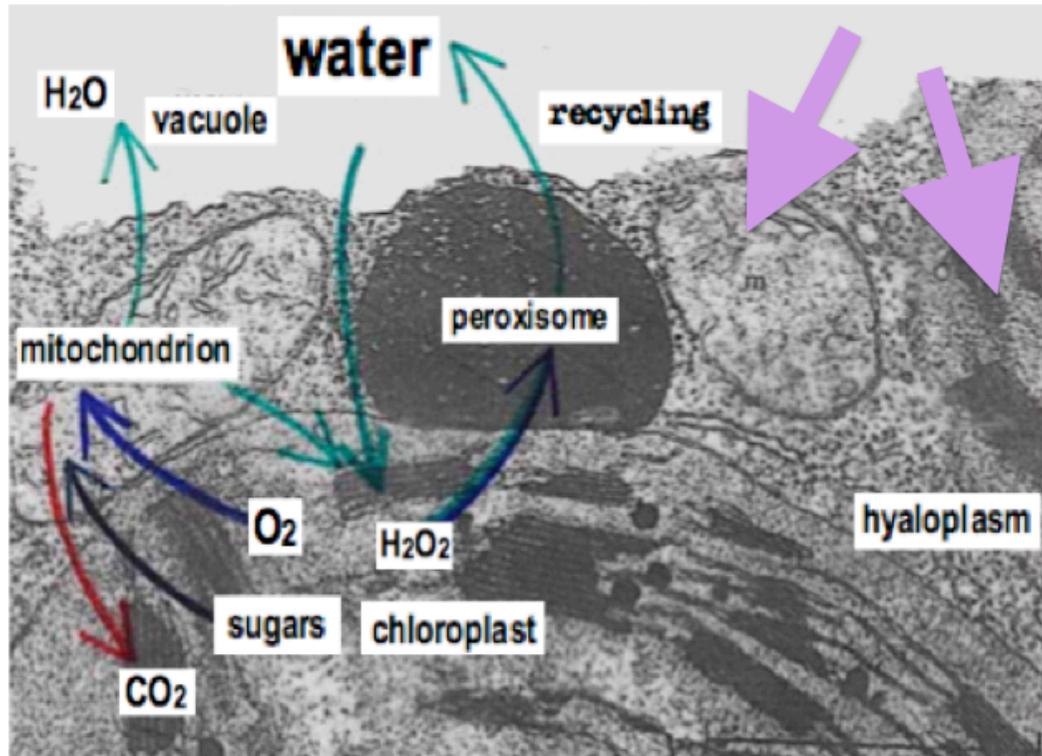


**REPRÉSENTATIONS
DES CONNAISSANCES
CONNAISSANCES DES
REPRÉSENTATIONS
en sciences de la vie :
aspects sociétaux et environnementaux.**

Pierre BRICAGE

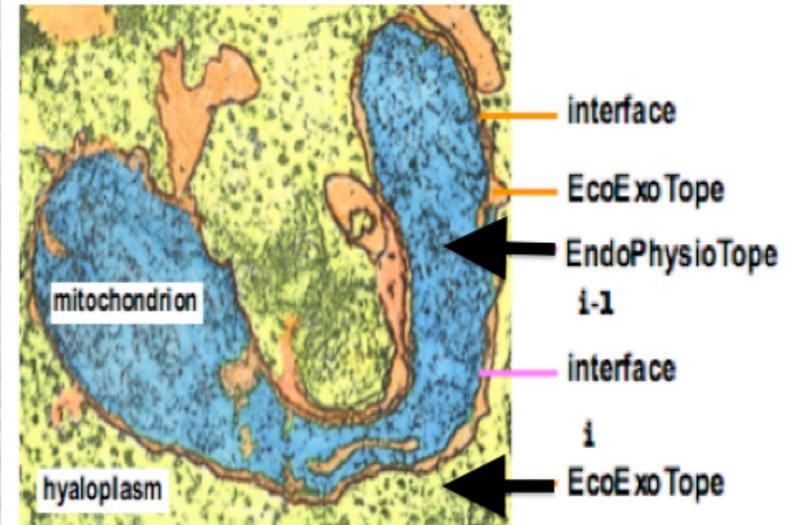
pierre.bricage@univ-pau.fr

A CELL IS AN ENDOSYNCENOSIS, AN ECOSYSTEM of ORGANISMS



E PLURIBUS
UNUM
IN VARIETATE
CONCORDIA

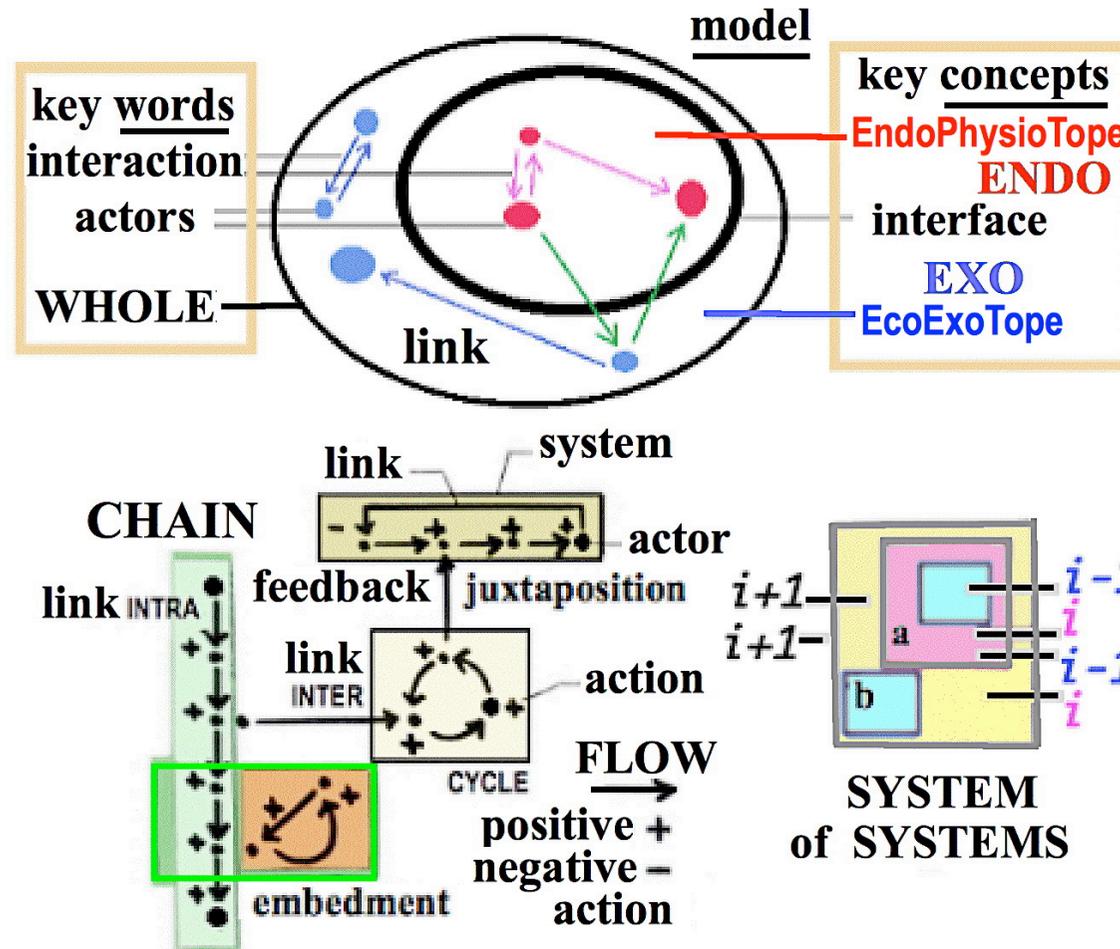
UNUS PRO OMNIBUS
OMNES PRO UNO
UN POUR TOUS
TOUS POUR UN

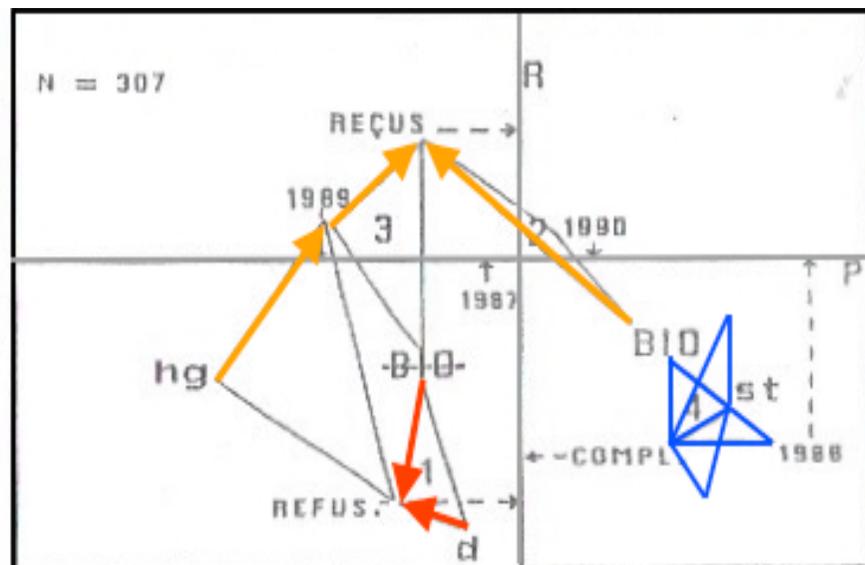
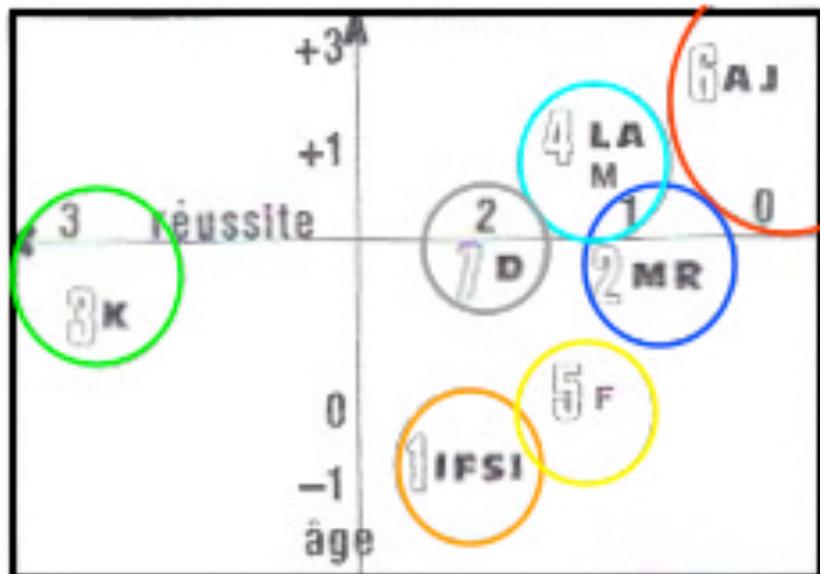


Bricage P. (1986) Isoperoxidases, markers of surrounding and physiological changes, in situ in leaves and in vitro in calli of *Pedilanthus tithymaloides* L. *variegatus*: cell compartmentation and polyfunctionality, control of activity by phenols, specific roles. p. 261-265. [Molecular & Physiological Aspects of Plant Peroxidases](#), Univ. Genève, (ISBN 2-88164-001-X)

ISSS July 18-23, 2010, Wilfrid Laurier University, Waterloo, ON, Canada. Balancing Individualism and Collectivism: ARMSADA

**FOR THE ONE TO SURVIVE
THE OTHER ONE MUST SURVIVE FIRST
AND RECIPROCALLY 2000**





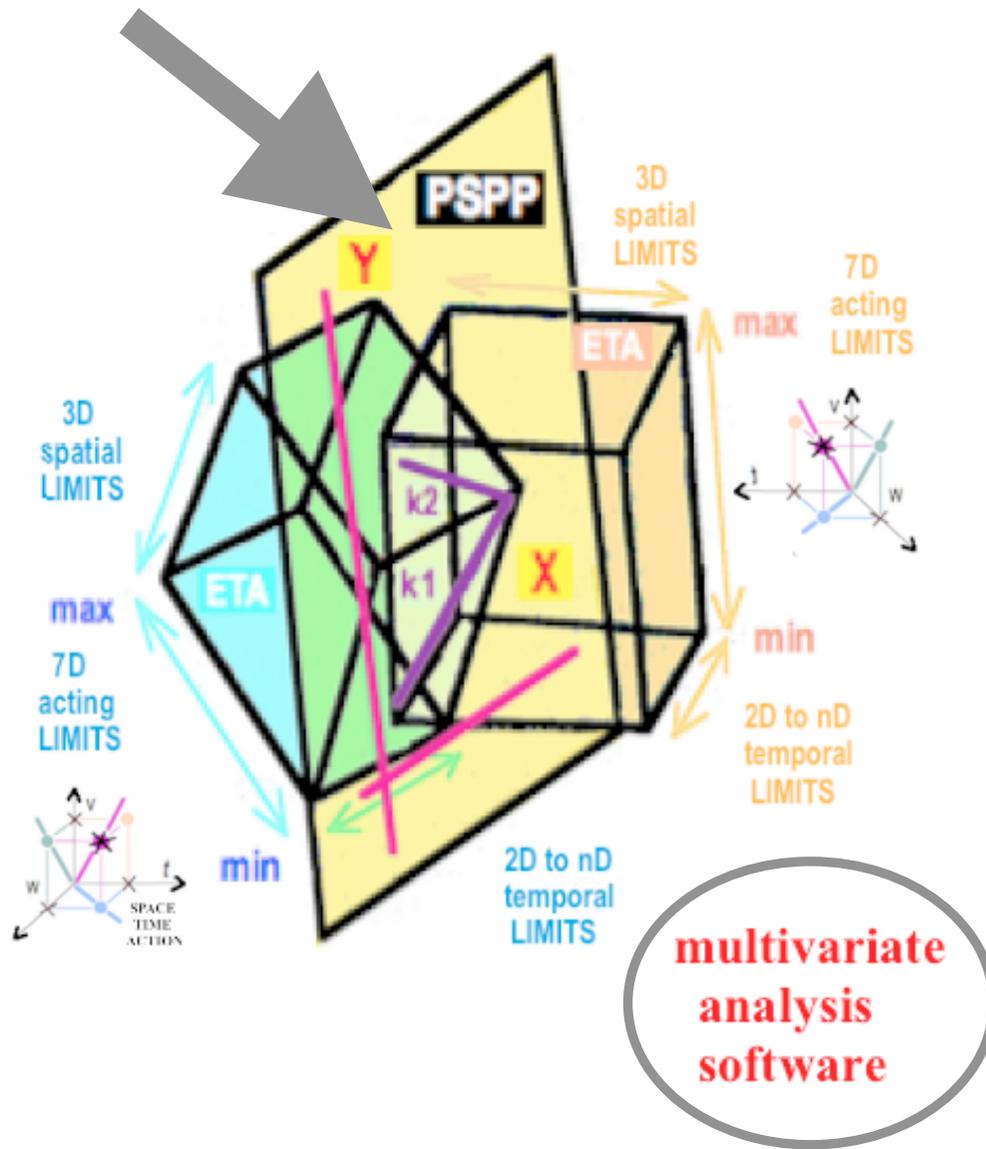
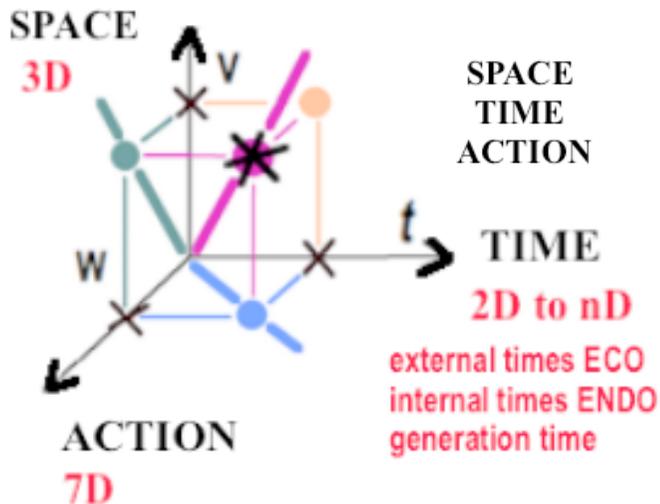
AFSCET Vers une nouvelle systématique ? Journées d'Andé 2010, 16 mai 2010

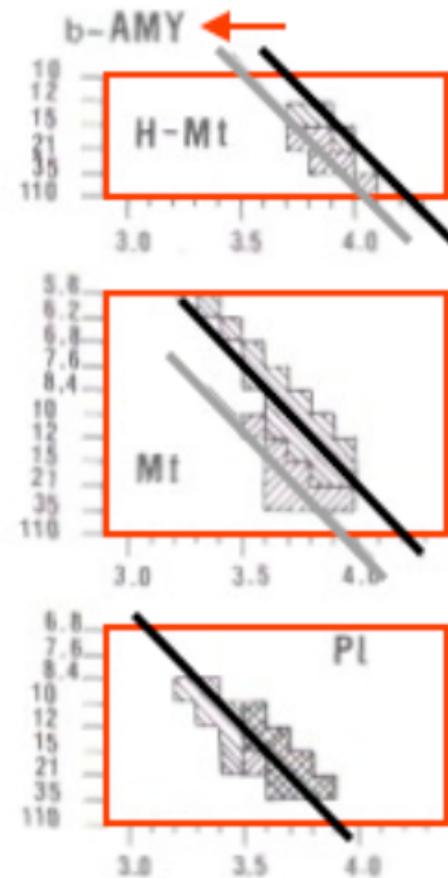
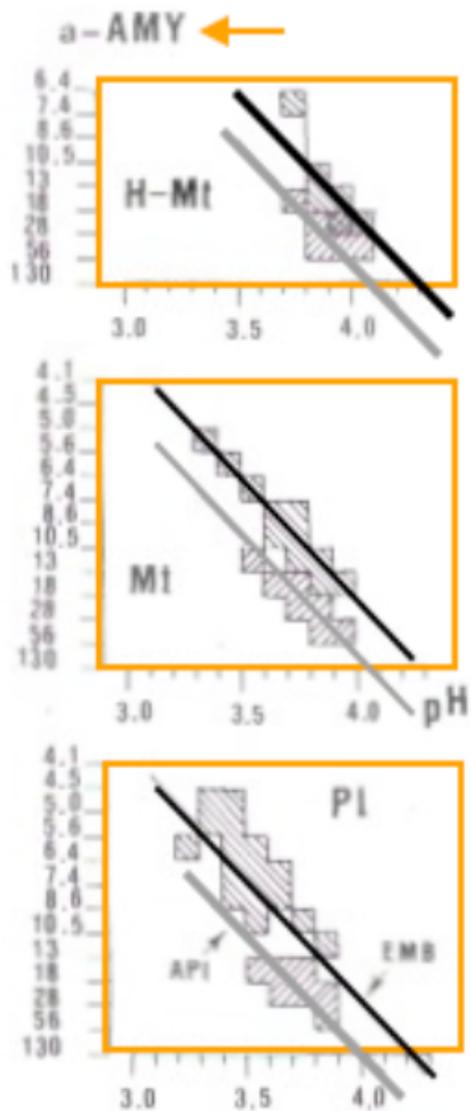
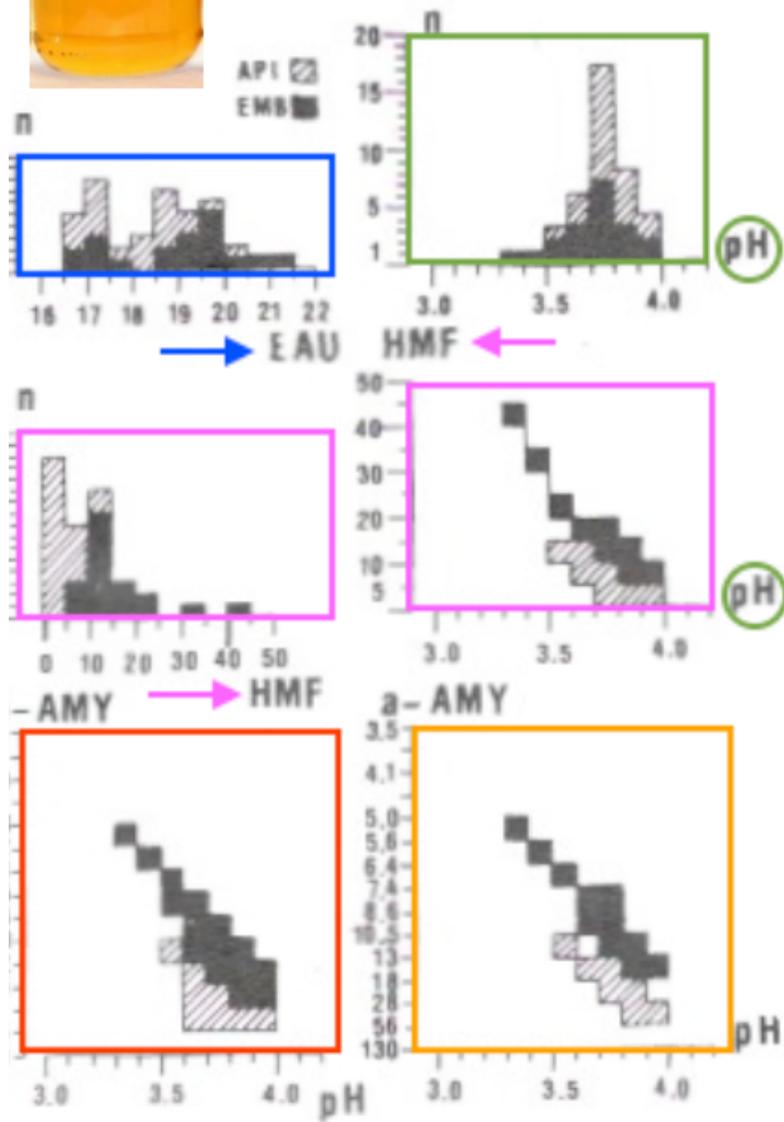
Epistemology and praxeology³³ outcome of the systemic modelling of the space-time-action field of the living systems.

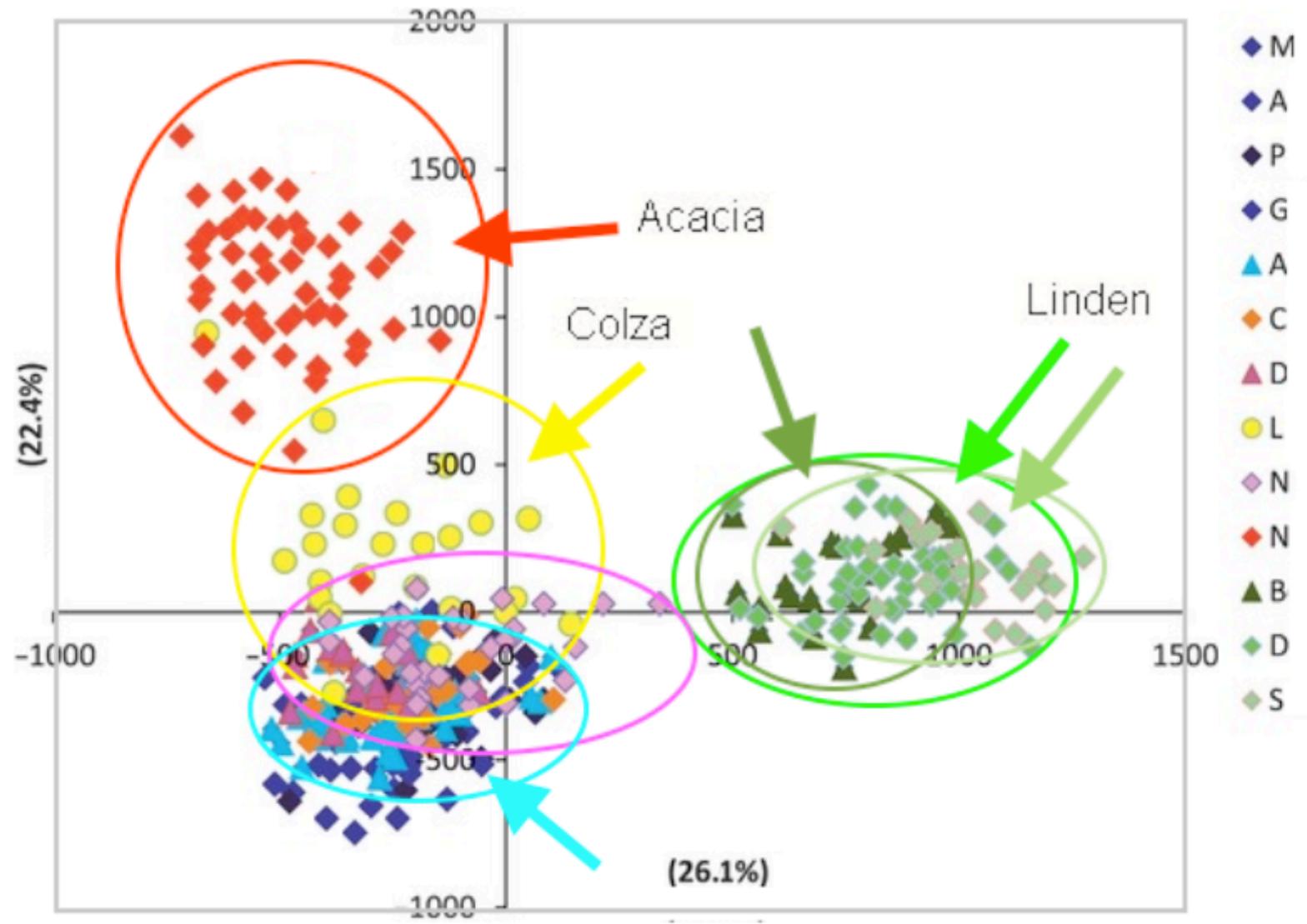
How all is about global co-determinism, local predictability and glocal impredic
A systemic approach of the systemic laws which rule the "living" Livings

Pierre BRICAGE
biosystemic

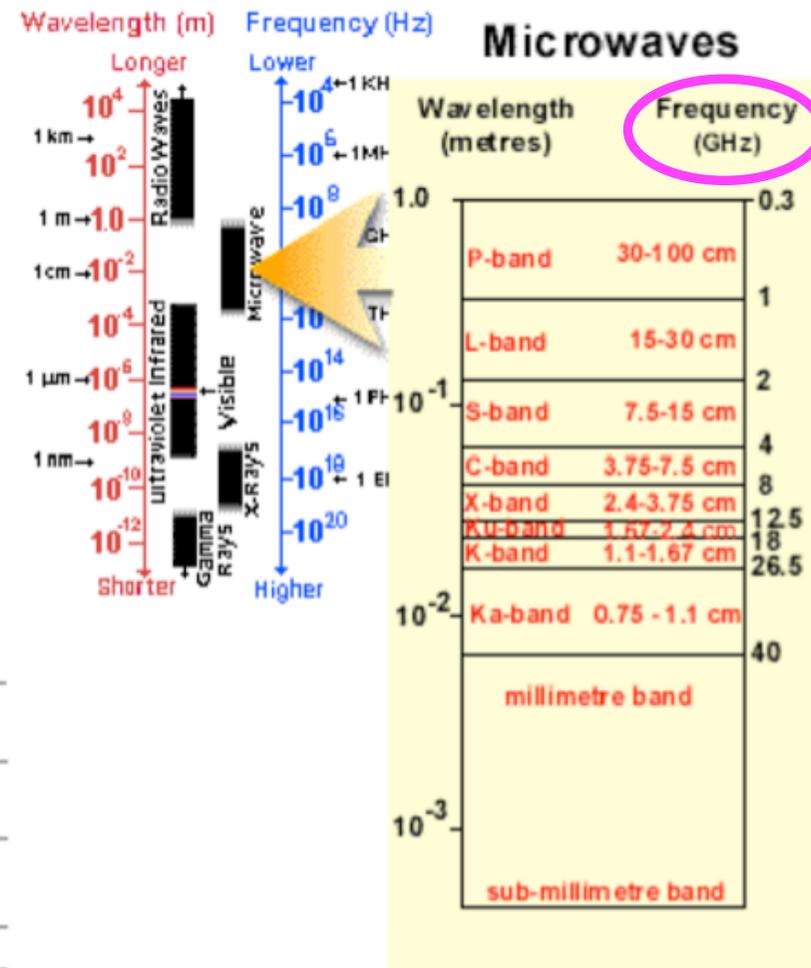
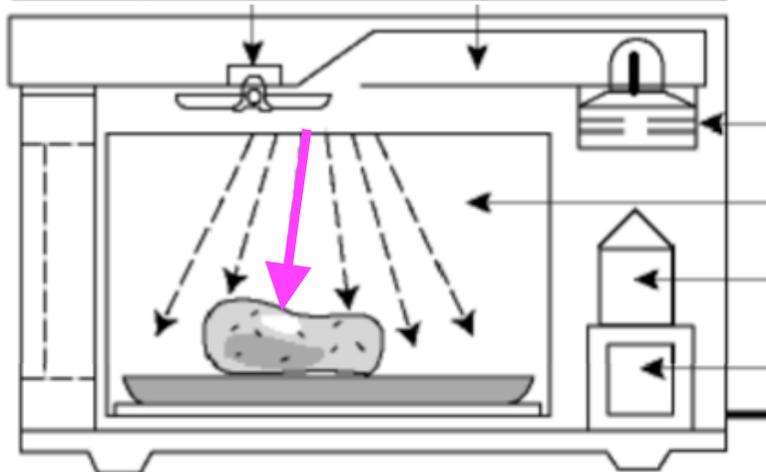
Faculty of Sciences & Techniques, University of Pau & Pays de l'Adour UPPA, 64000 Pau, Fra
associate general secretary of **AFSCET** The French Association of Systemic & Cybernetic Scie
managing editor of *Res-Systemica*, the "On Line" review of The European Union of Systemic **EUS**
member of **IASCYS** The International Academy of Systemic & Cybernetic Sciences
a body of **IFSR** The International Federation of System Research

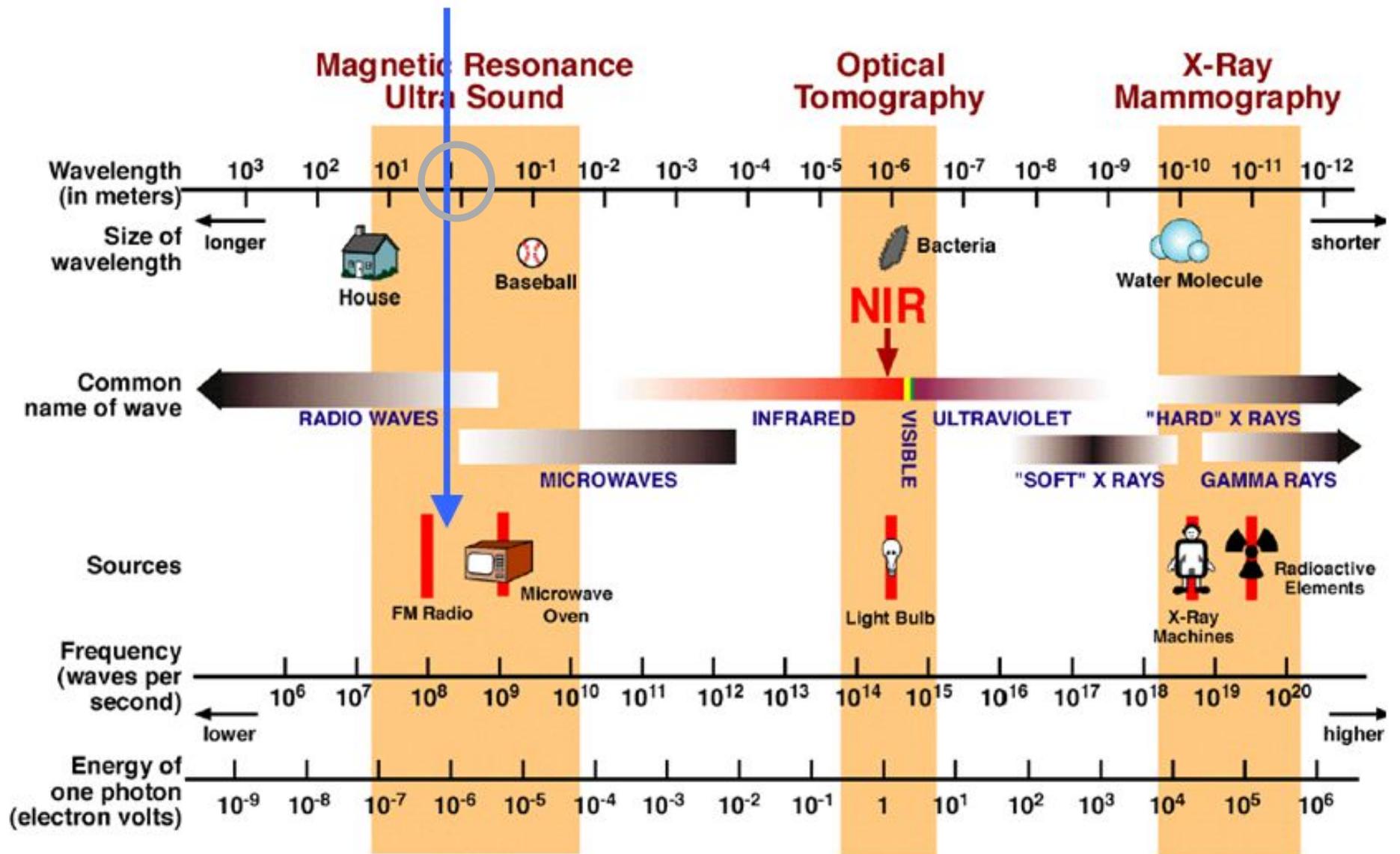


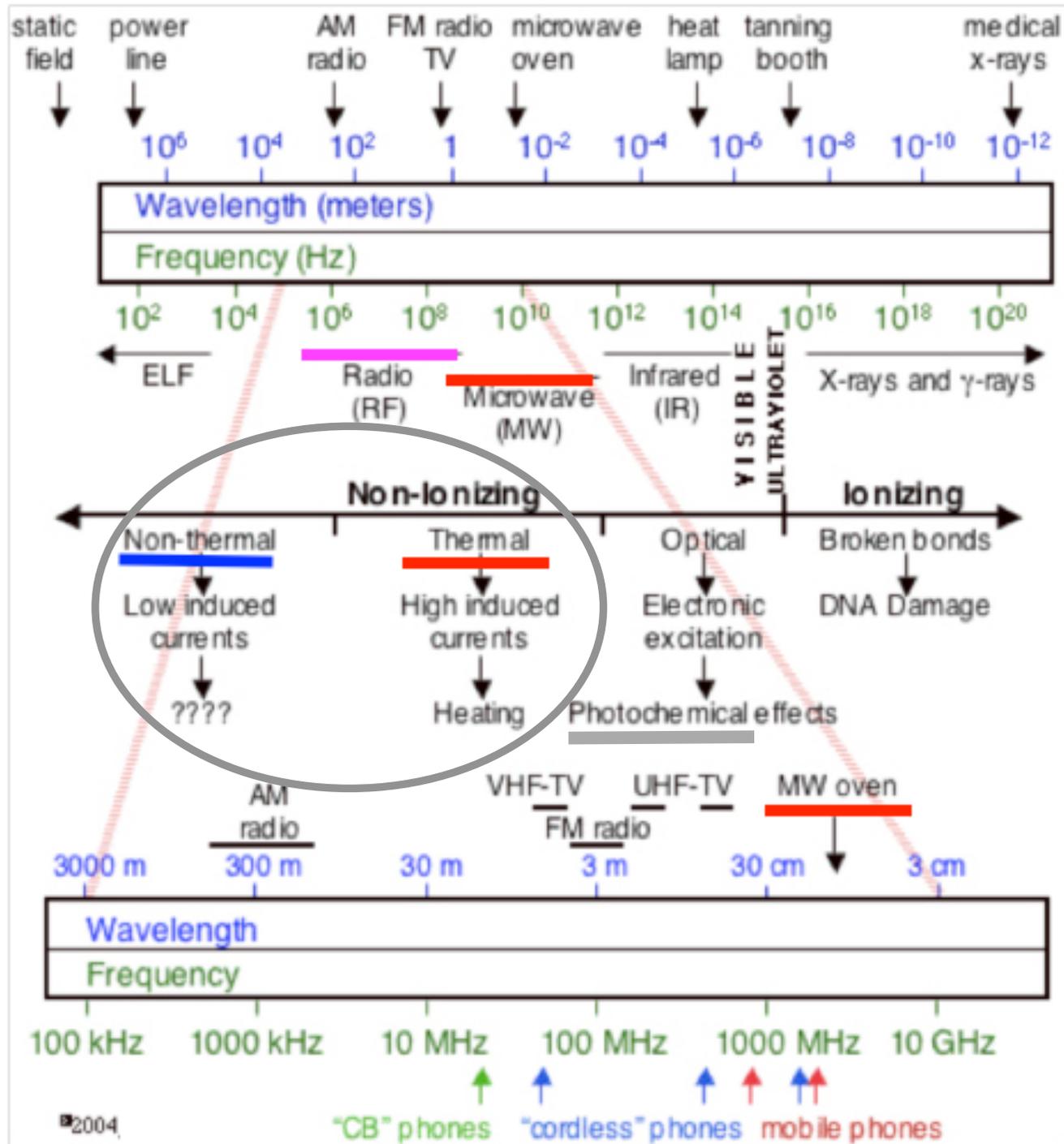




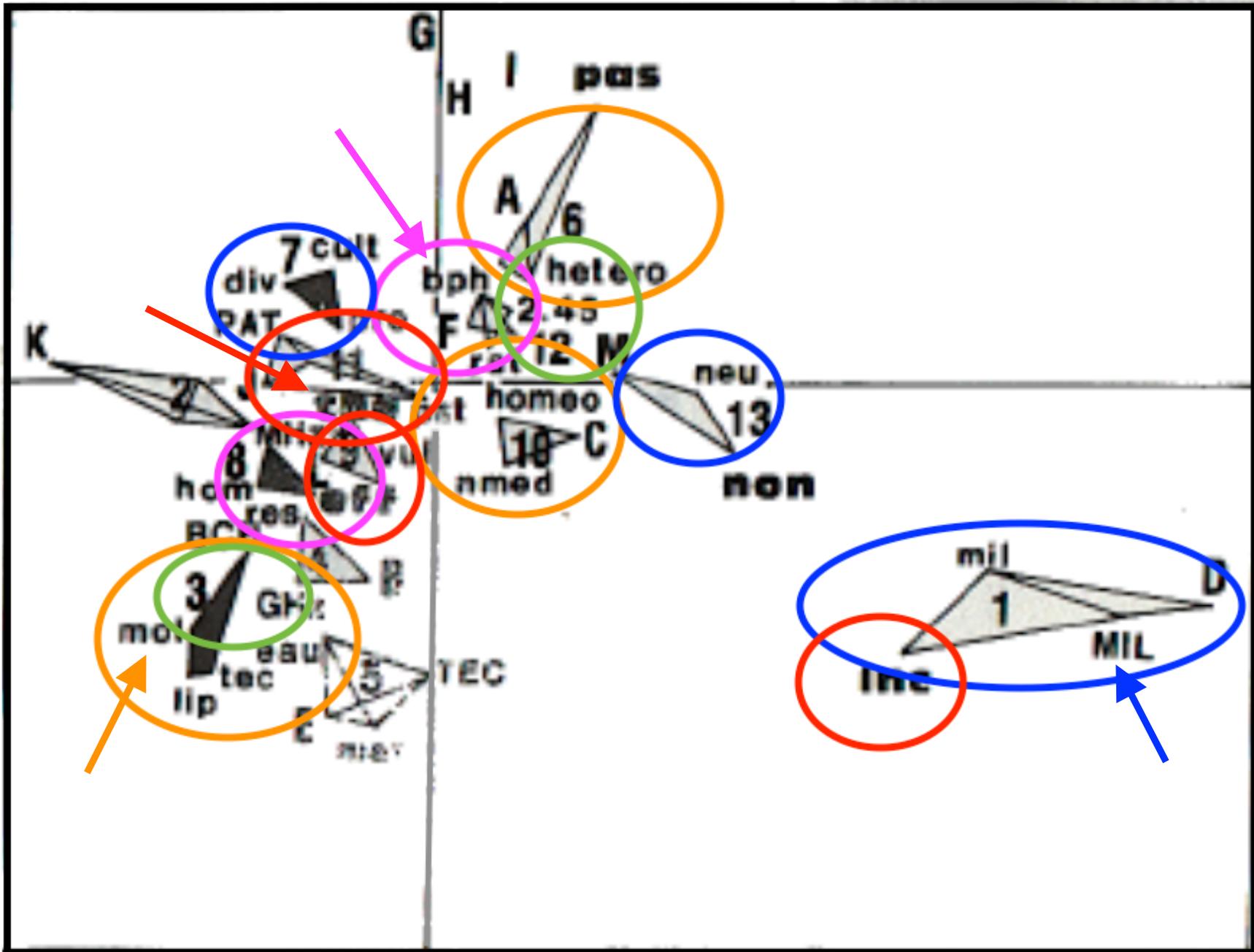
SOME COMMON RADAR BANDS.		
HF	3 to 30 MHz	OTH surveillance
VHF	30 to 300 MHz	Long-range surveillance
UHF	300 to 1000 MHz	Long-range surveillance
L-band	1 to 2 GHz	Long-range surveillance
S-band	2 to 4 GHz	Moderate-range surveillance
C-band	4 to 8 GHz	Long-range tracking
X-band	8 to 12 GHz	Short-range tracking
Ku-band	12 to 18 GHz	High-resolution mapping
K-band	18 to 27 GHz	Police/traffic radar
Ka-band	27 to 40 GHz	Police/high-resolution mapping







X2



X1

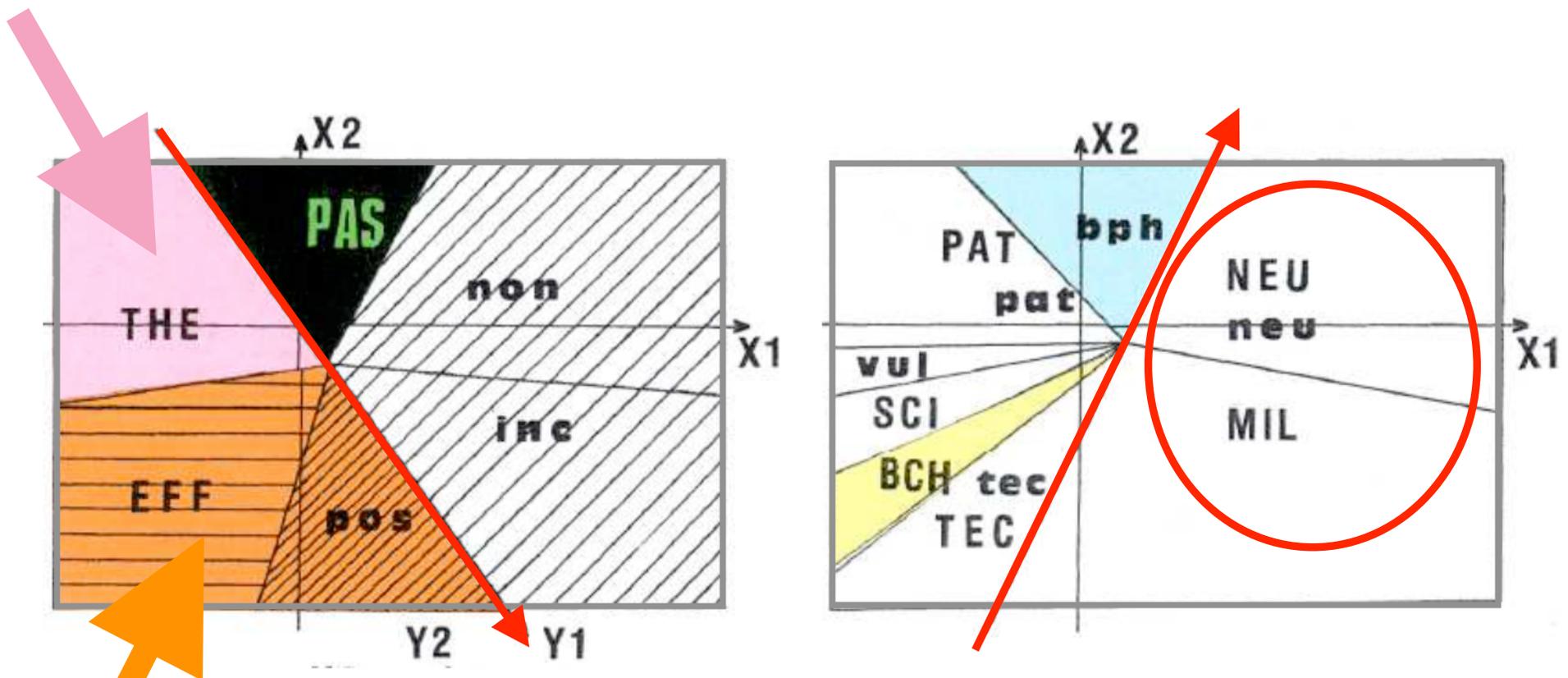
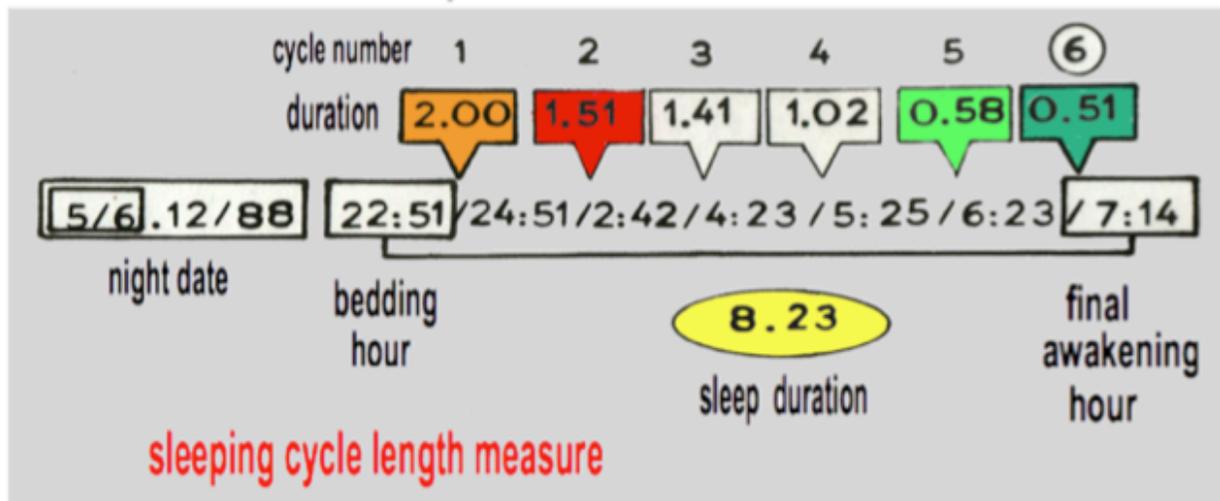
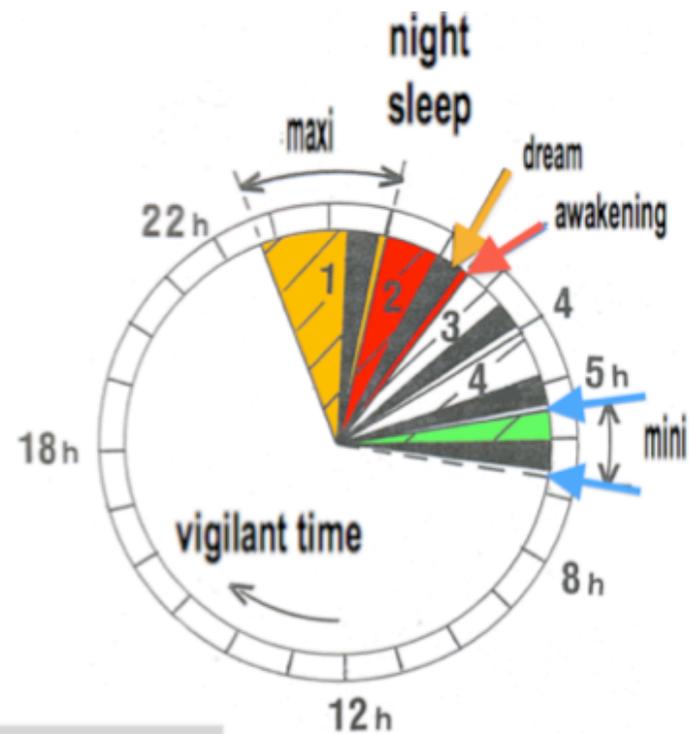
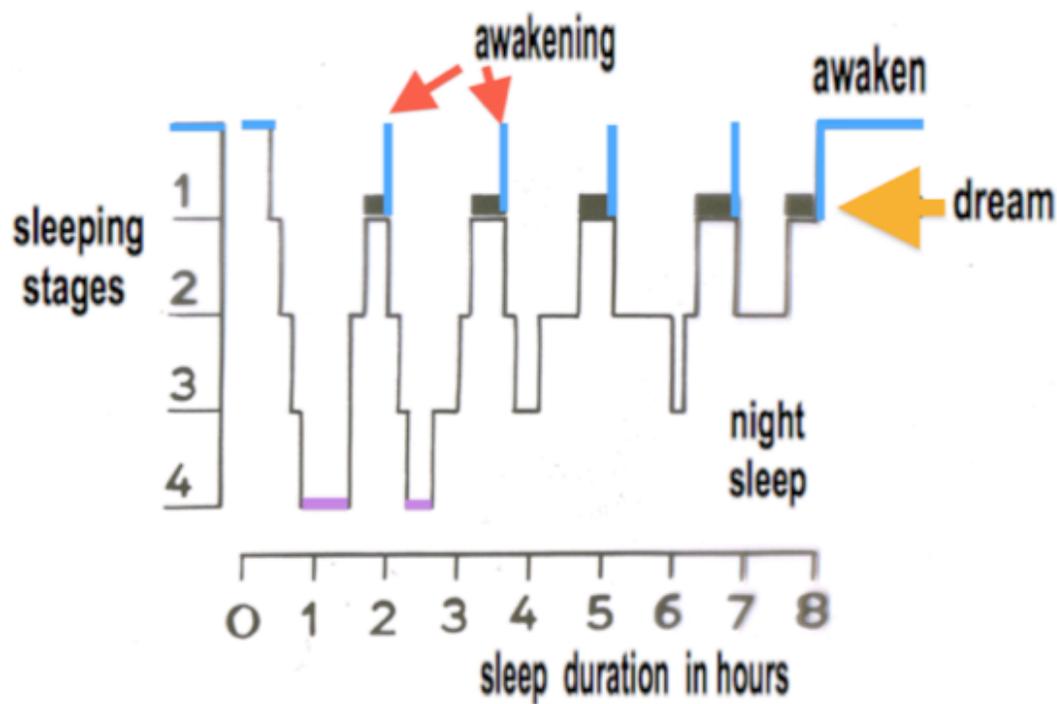
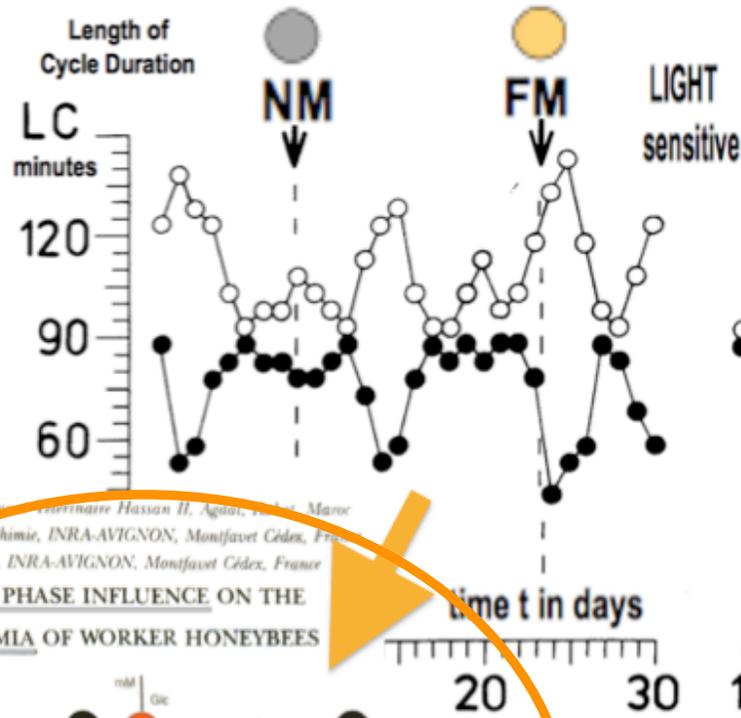


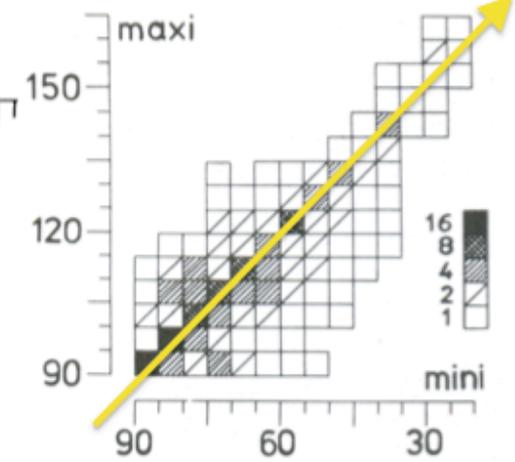
Figure 26. Projections dans le plan d'analyse factorielle des espaces de corrélations associés aux classes d'effet des micro-ondes (fig. 15) ou aux classes d'articles ou de revues de publication (fig. 9).

X_1 , X_2 axes du plan d'analyse factorielle (fig. 23), Y_1 axe de projection suivant les groupes de corrélations (de probabilités, au moins égales à 90% dans le plan des écarts non-pondérés, au moins égales à 85% dans le plan des contributions au Khi-deux: fig. 23) associés aux classes d'effet des micro-ondes (toutes les classes sont discriminantes)





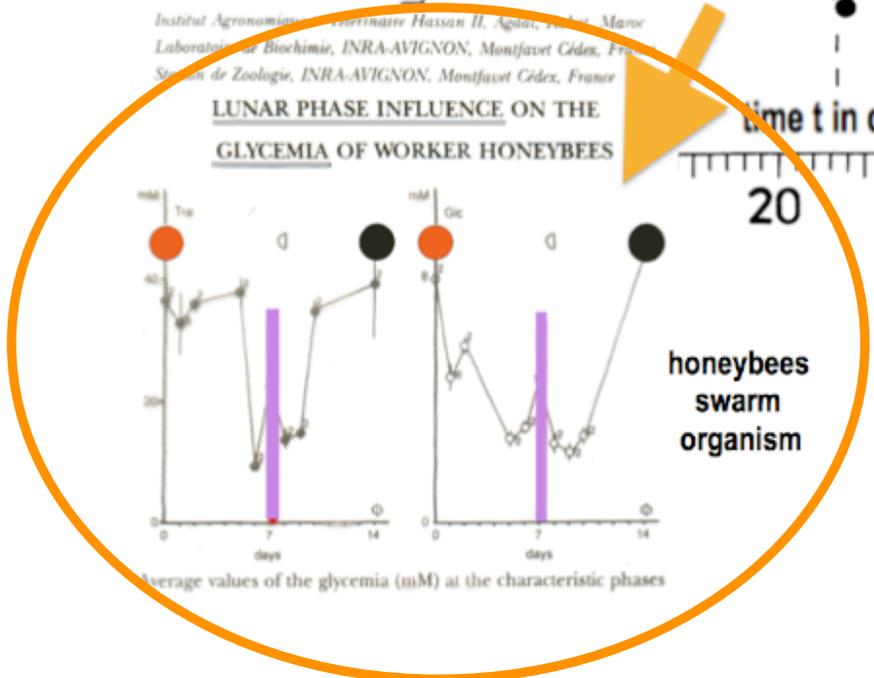
insensitive or resistant

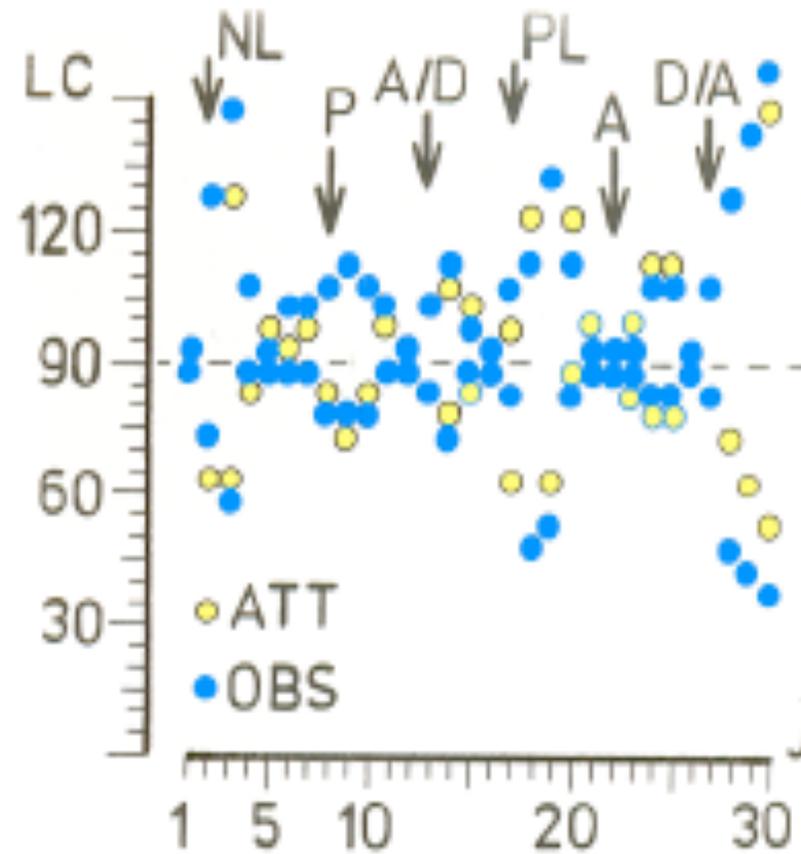
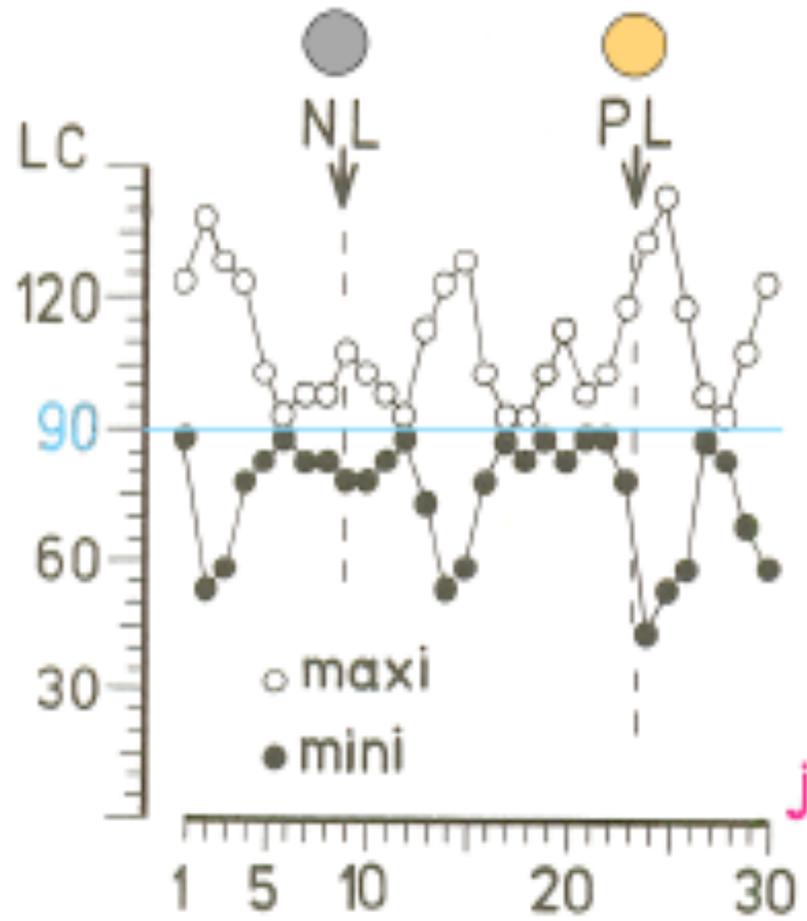


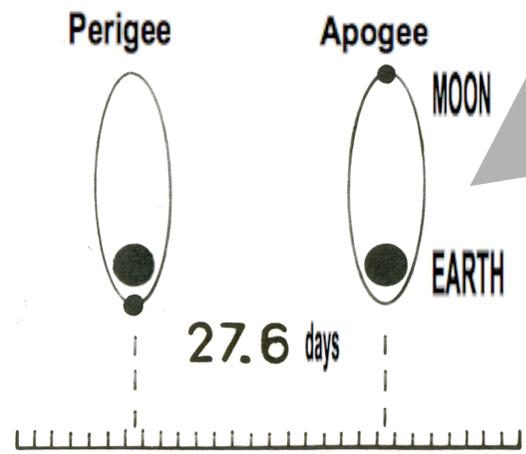
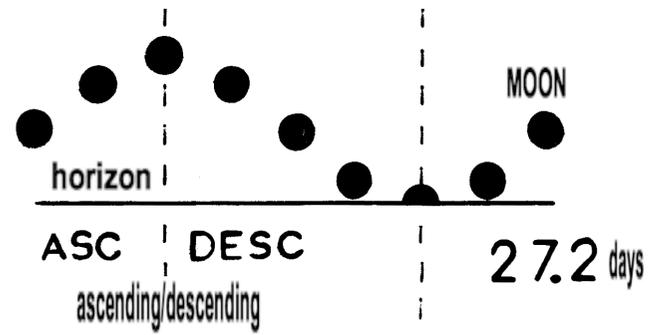
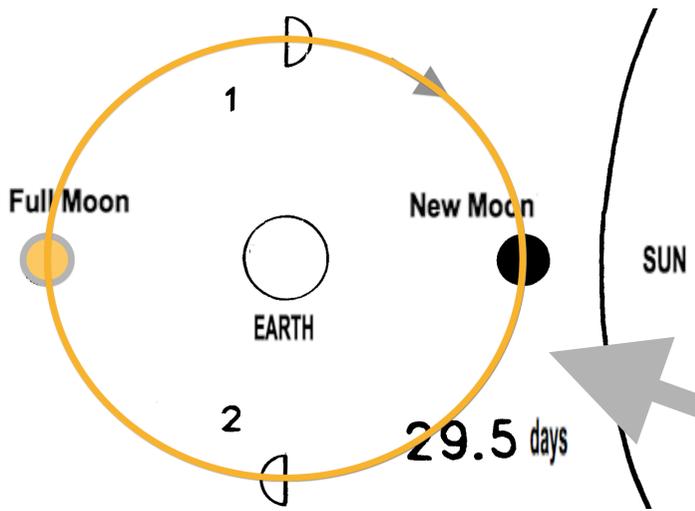
first order relationship

Institut Agronomique Mohammed VI, Agadir, Maroc
 Laboratoire de Biochimie, INRA-AVIGNON, Montfavet Cedex, France
 Station de Zoologie, INRA-AVIGNON, Montfavet Cedex, France

LUNAR PHASE INFLUENCE ON THE GLYCEMIA OF WORKER HONEYBEES



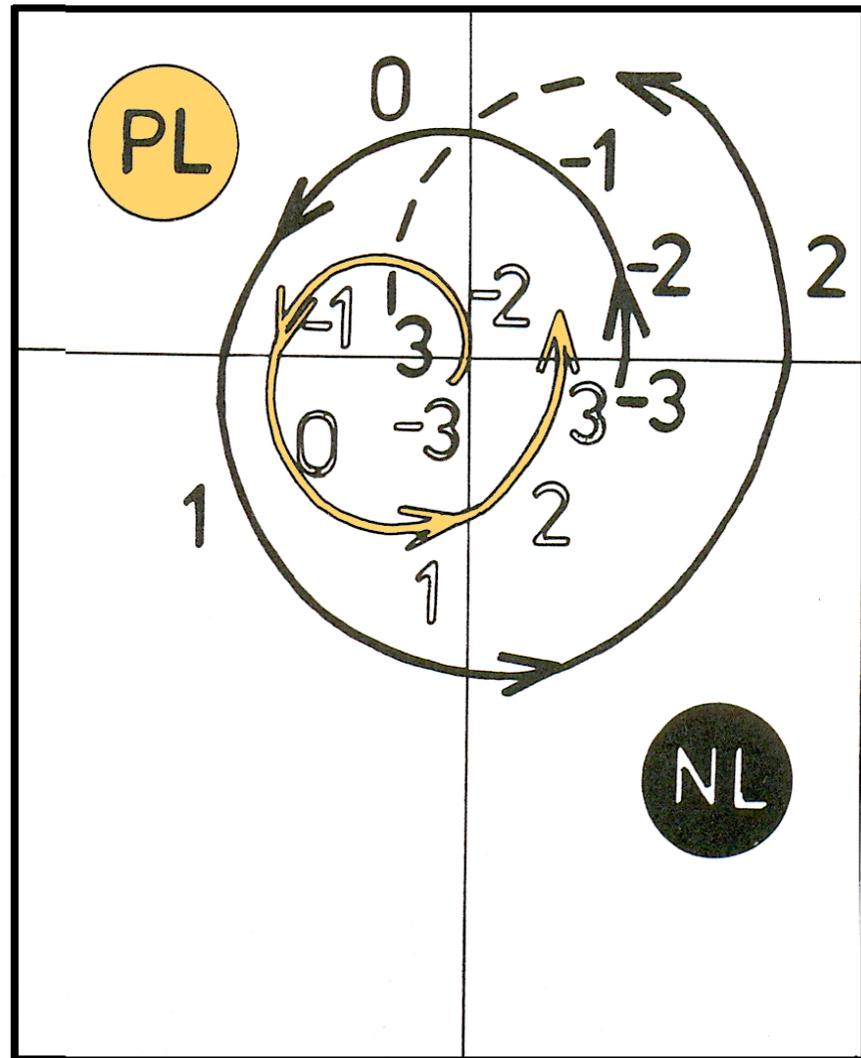
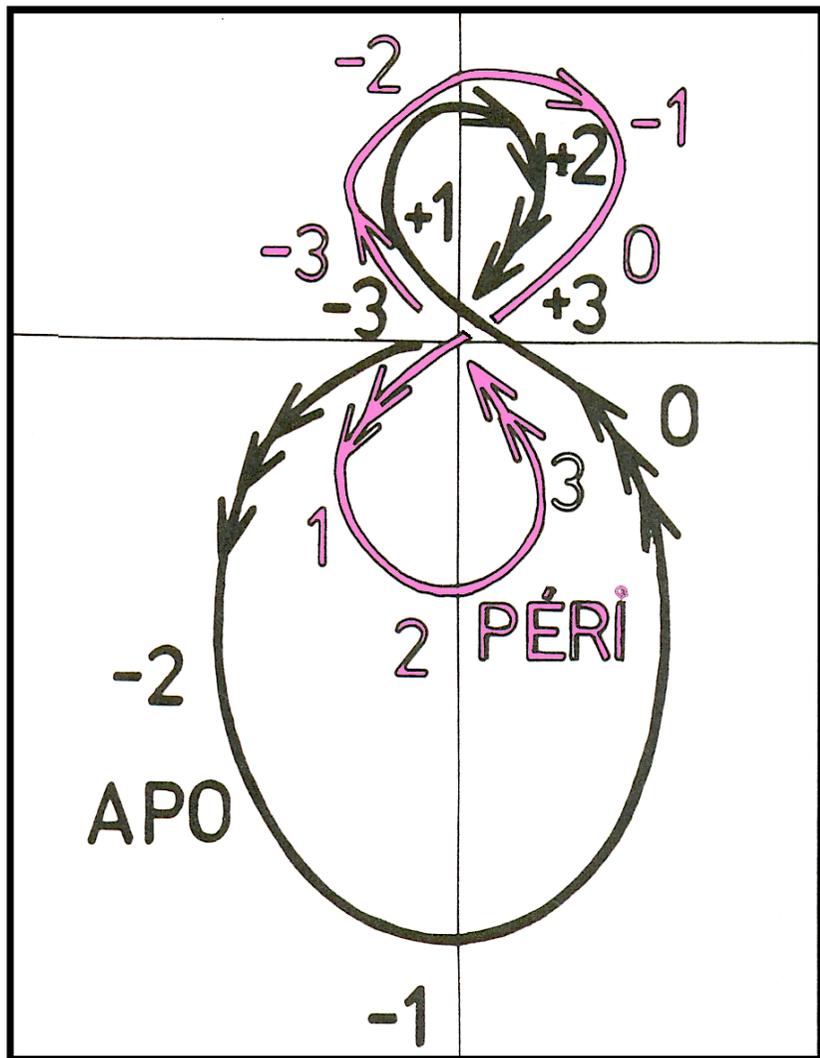




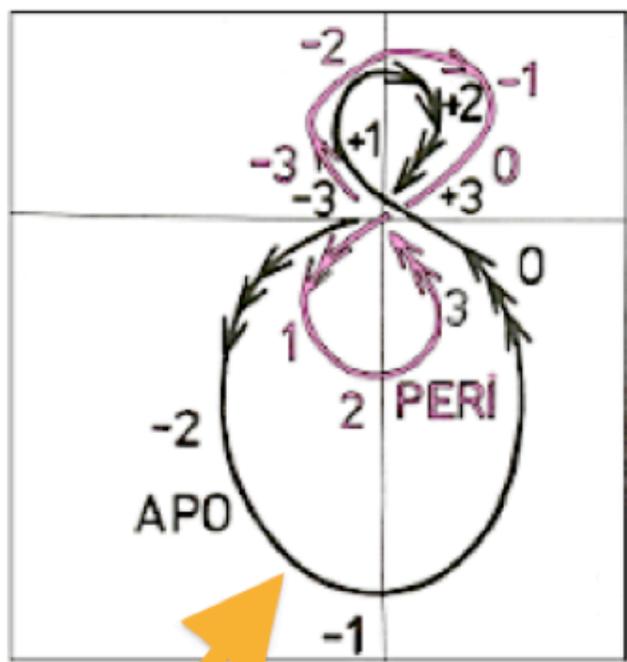
**physical
point of
view**

**societal
economical
theological**

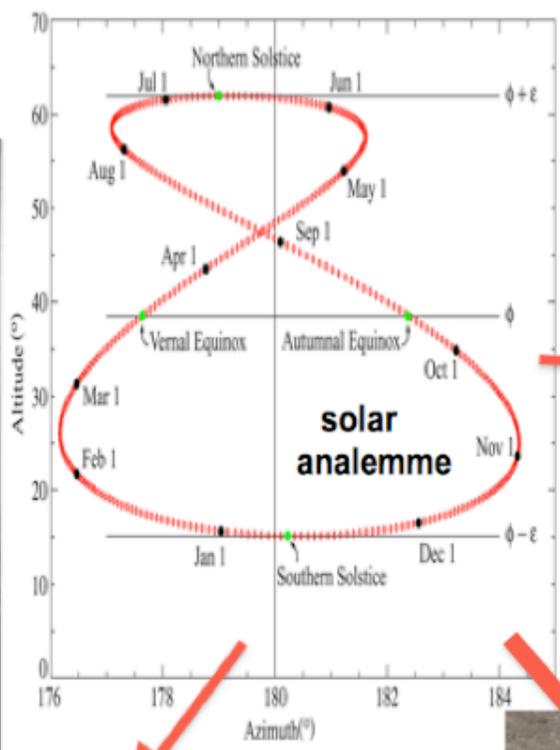




**lunar
analemme**

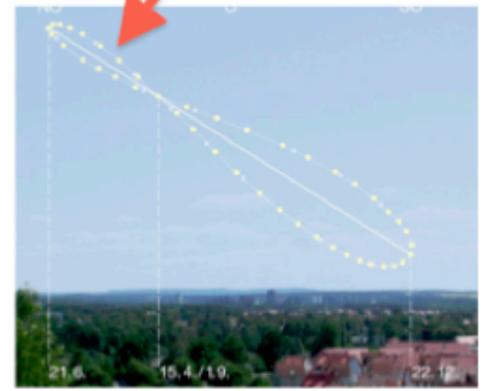
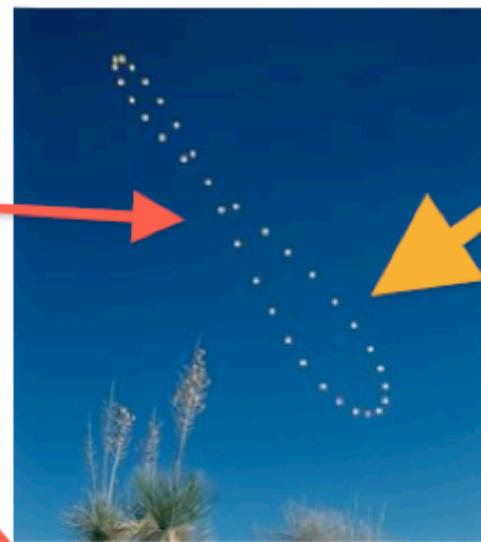


**ecological and
physiological
interactions**

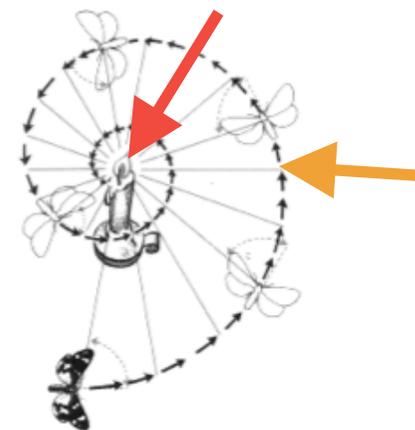
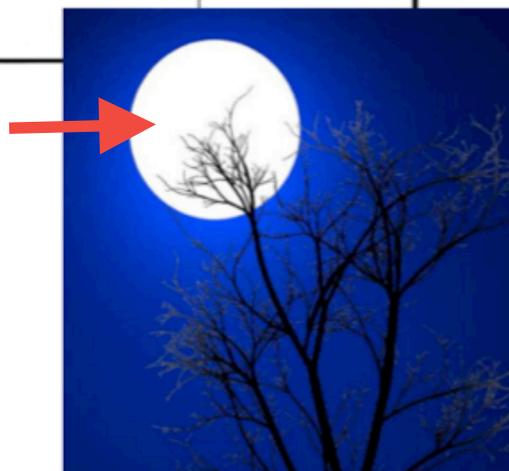
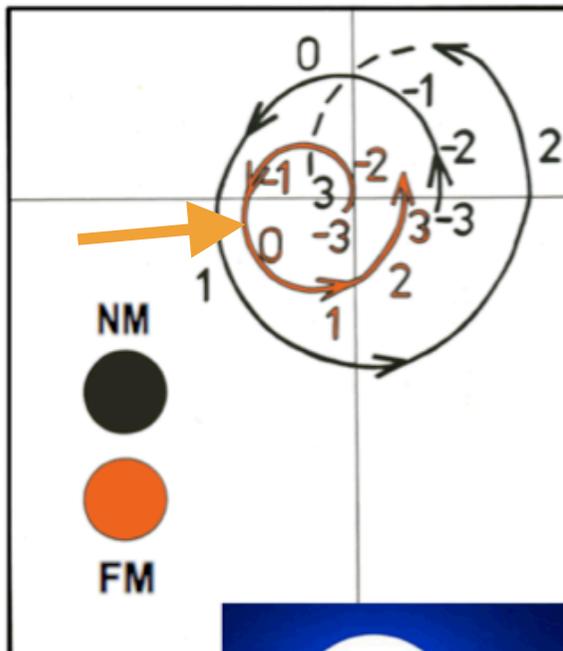
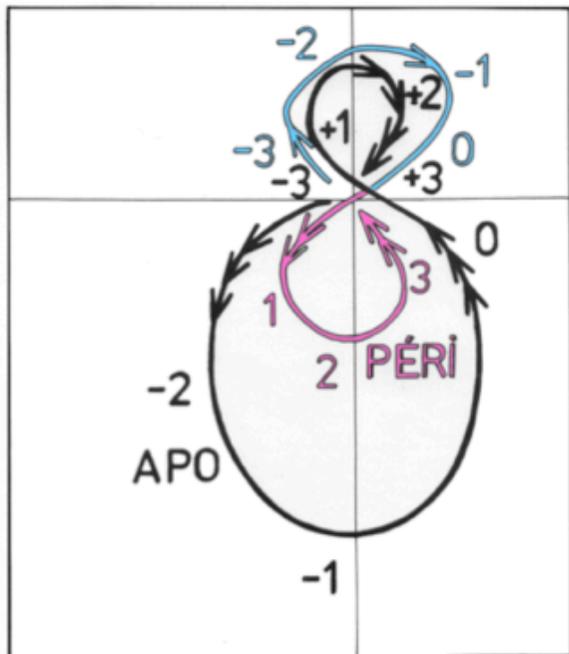


**solar
analemme**

**lunar
analemme**

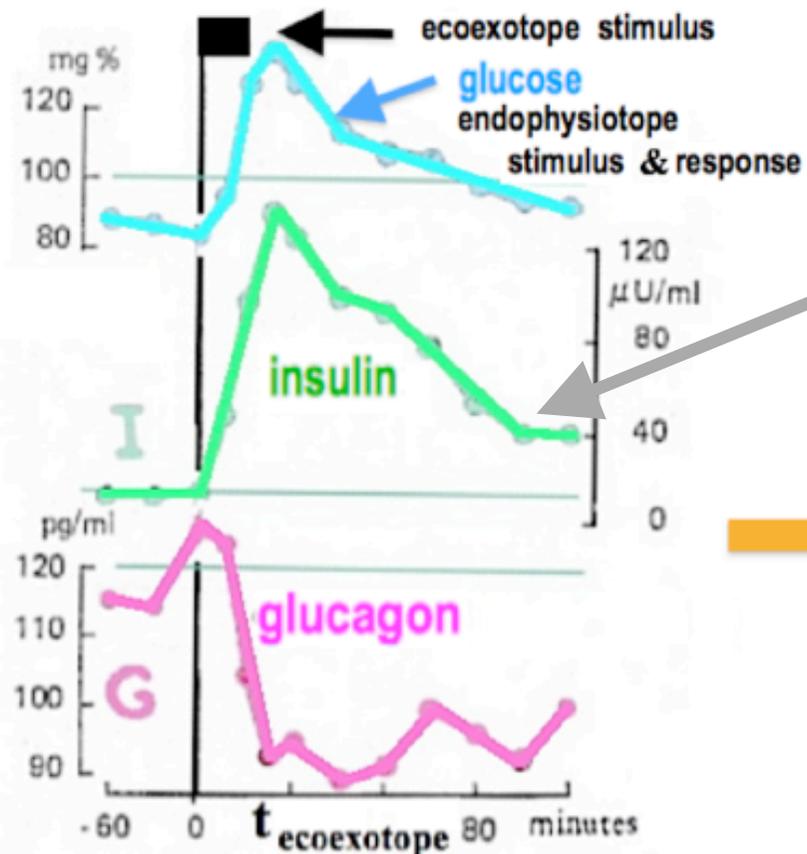


stone ships and the analemma solar observatory at King Anund's barrow

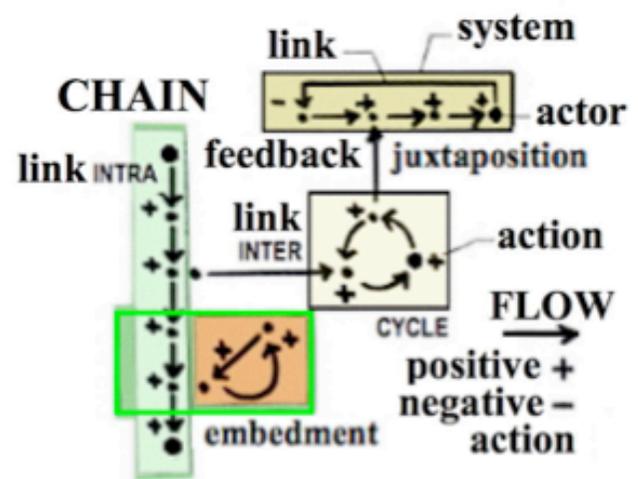
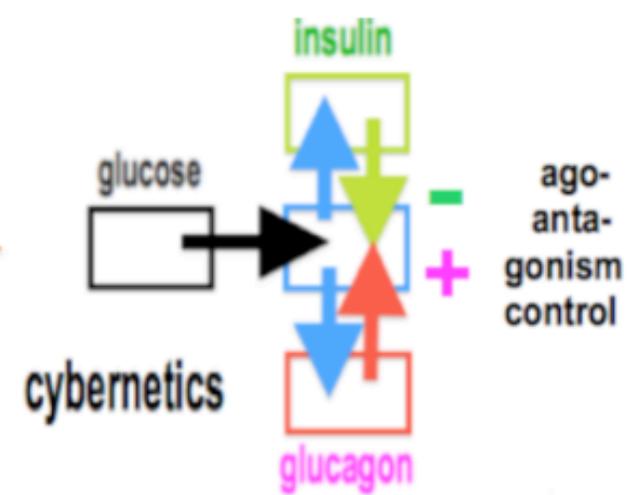
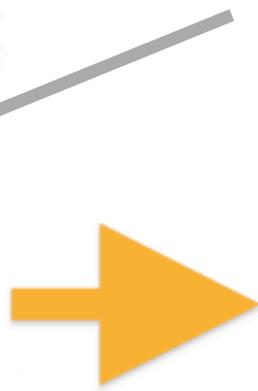
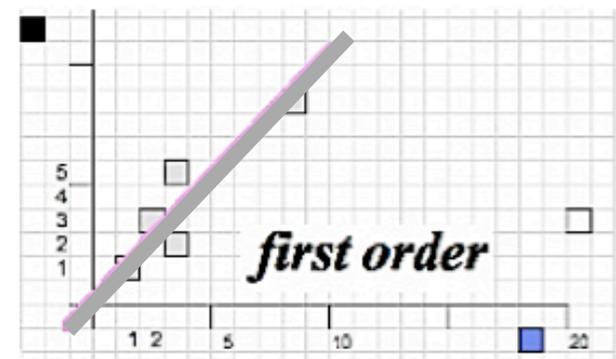


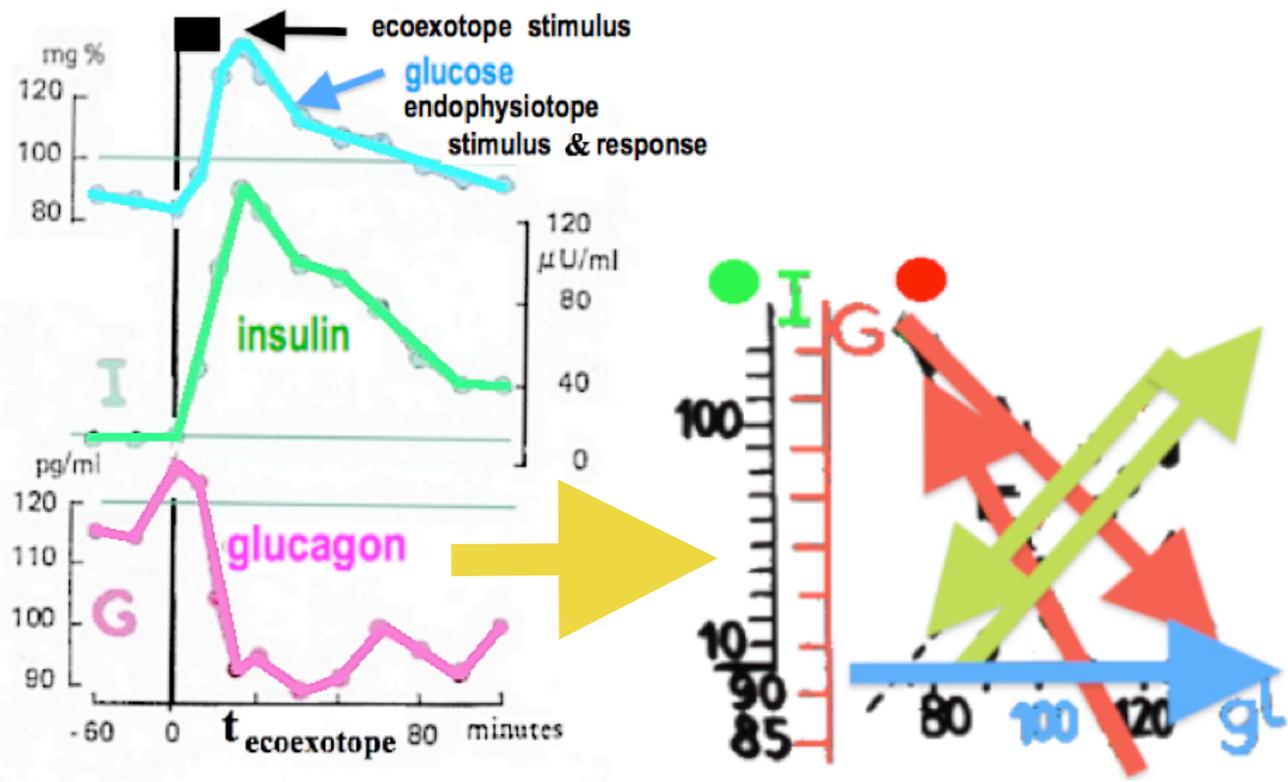
Bricage P. (1997) *Biological rhythms: Moon entrainment*. *Le Ciel* 116: 71-77.
[French Pyrenees Astronomical Society](#)



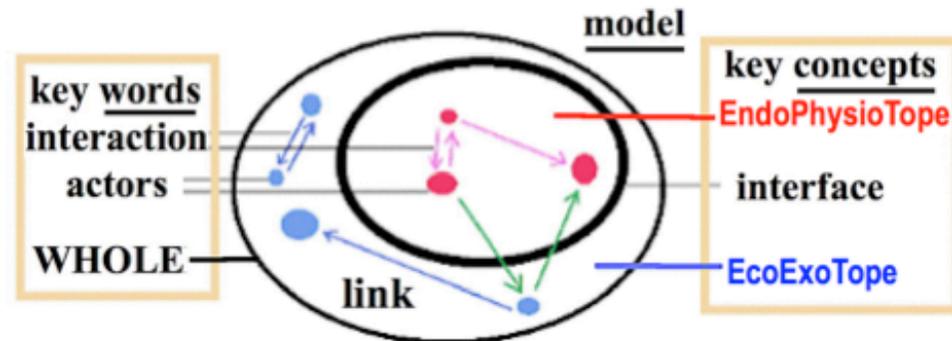
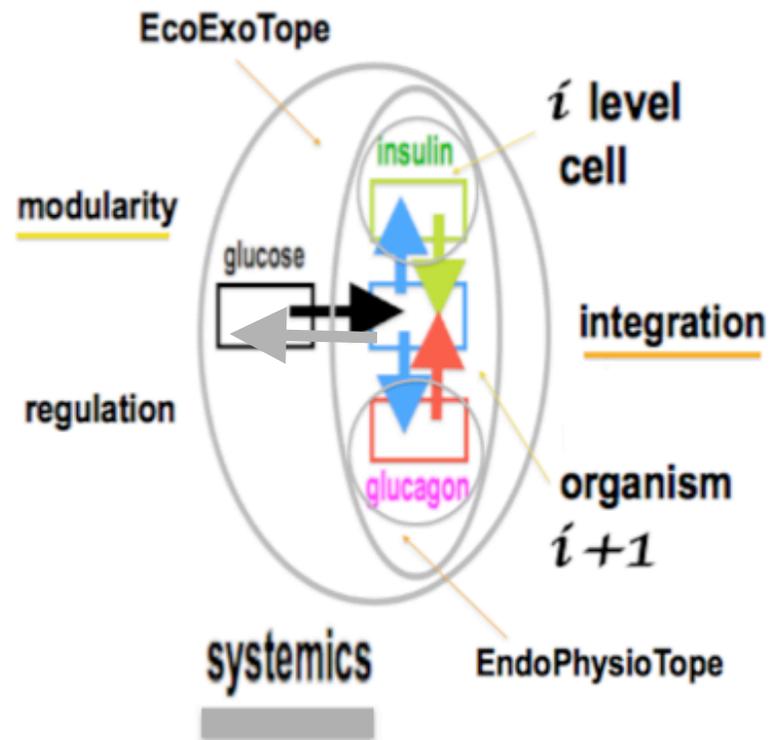
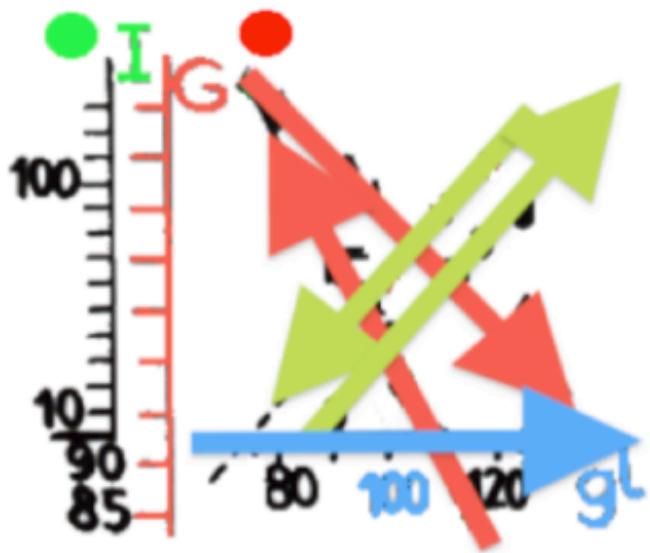


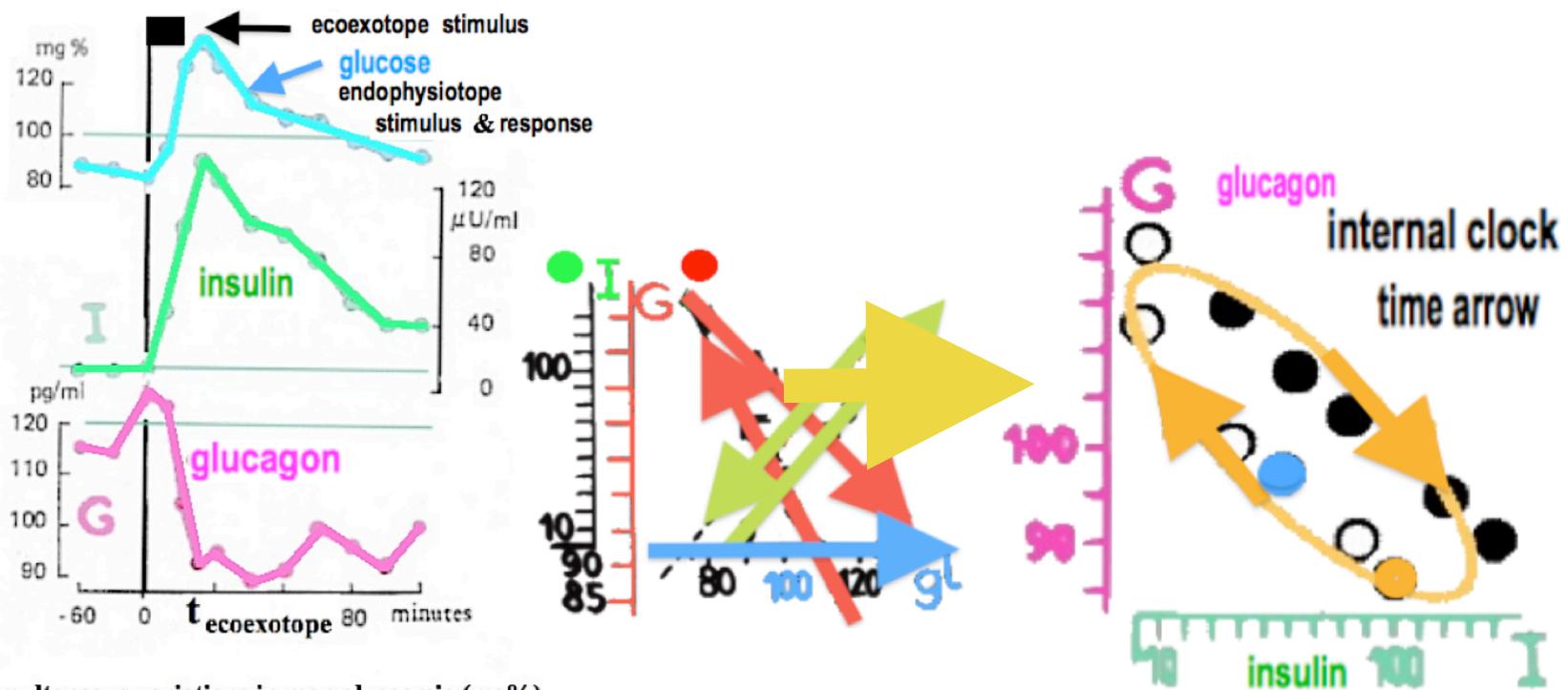
Simultaneous variations in man glycaemia (mg%), insulinaemia I (μU/ml) & glucagonaemia G (pg/ml), external time of the ecoexotope in minutes. (R. Unger, New England J. Med., 1970, n° 282, p. 109.)



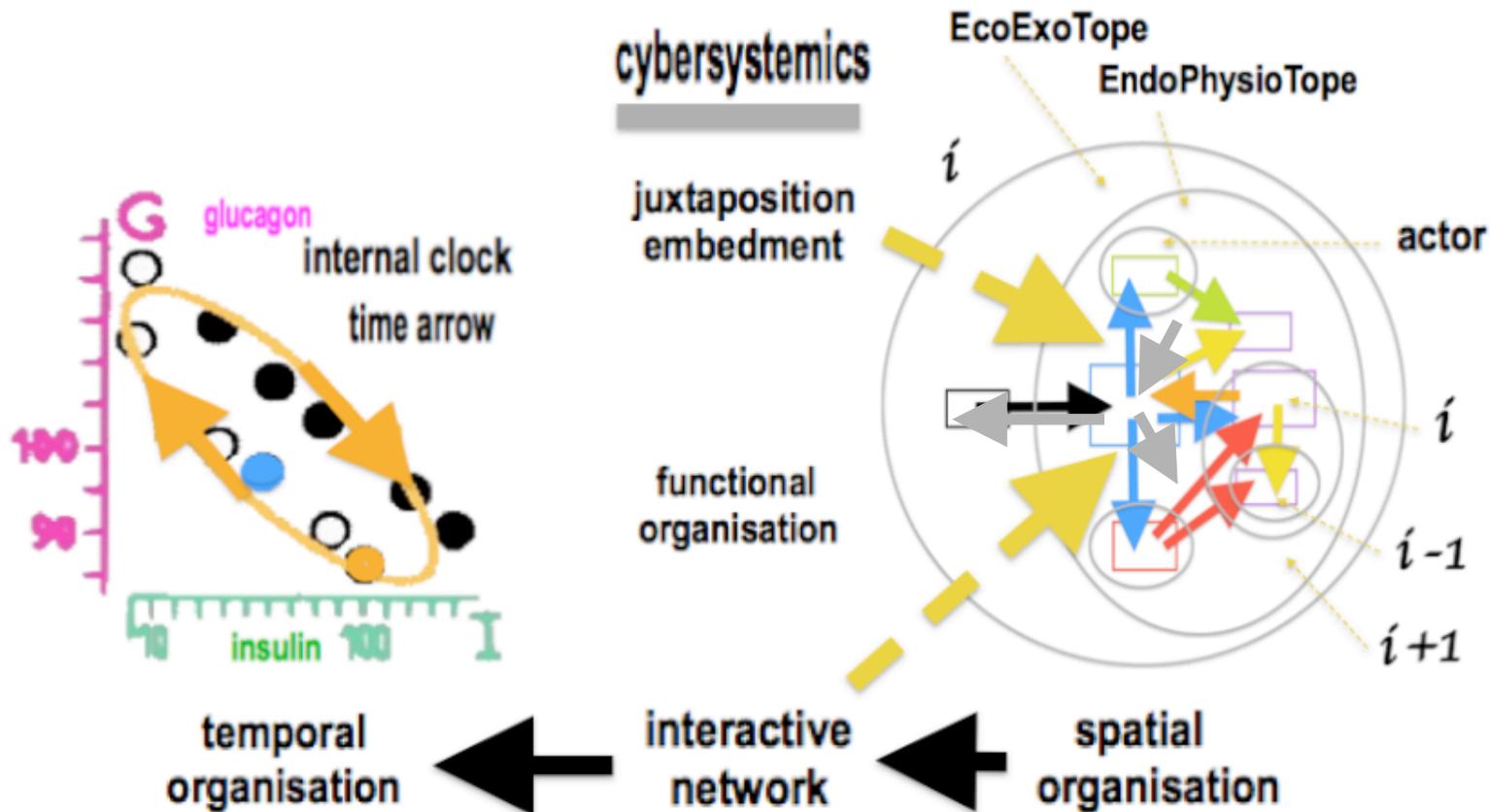


**Simultaneous variations in man glycaemia (mg%),
 insulinaemia I (μ U/ml) & glucagonaemia G (pg/ml),
 external time of the ecoexotope in minutes.
 (R. Unger, New England J. Med., 1970, n° 282, p. 109.)**





Simultaneous variations in man glycaemia (mg%),
 insulinaemia I (μ U/ml) & glucagonaemia G (pg/ml),
 external time of the ecoexotope in minutes.
 (R. Unger, New England J. Med., 1970, n° 282, p. 109.)



The WHOLE is more and less than the product of its PARTS.

The simplest graphic 2D representations are always conics or assembly of conics.

The usual space trajectory of a mobile in a field of gravity, is a conic.

The same for the time trajectory of a living system.

In its field of space-time-action it is a conic.

Circle $X1^2 + X2^2 = K$

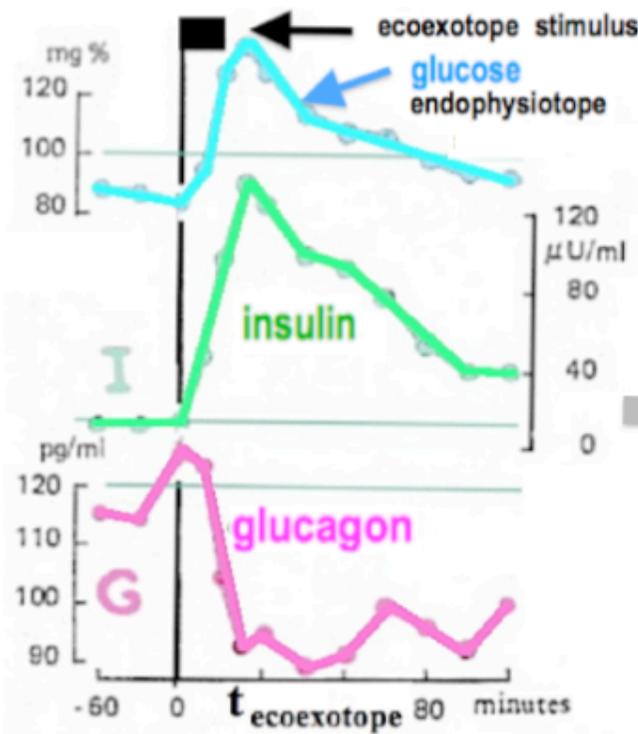
Hyperbola $X1 \times X2 = K$ the WHOLE is the product of the parts
(welcome capacity) x (capacity to be welcomed) = K,

$X1^2 - X2^2 = (X1 + X2)(X1 - X2) = K$

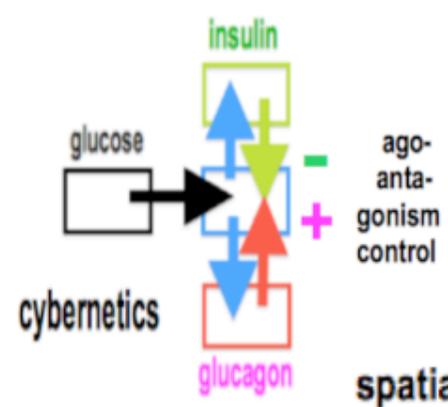
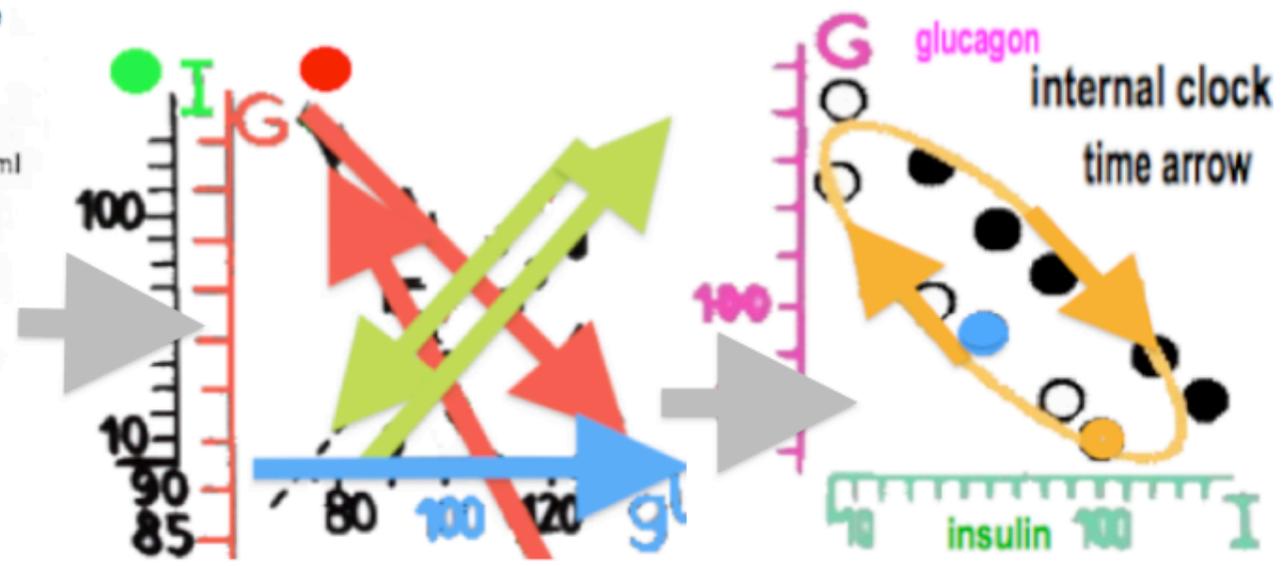
the WHOLE is the product of the sum and the difference of the parts

Ellipse $X^2 + Y^2 + 2XY = K = (X + Y)(X + Y)$

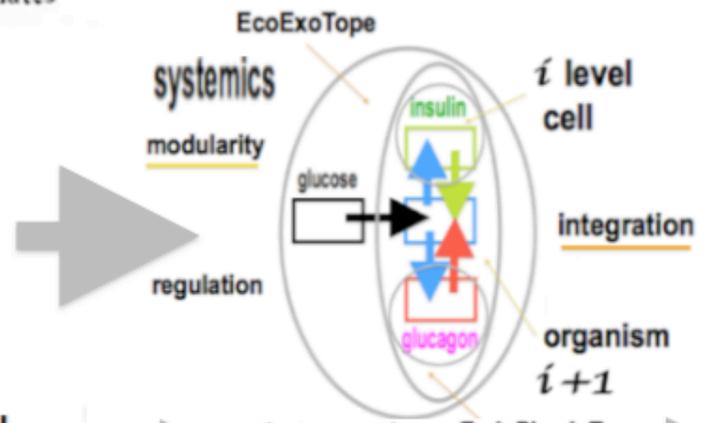
the WHOLE is the square product of the sum of the parts.



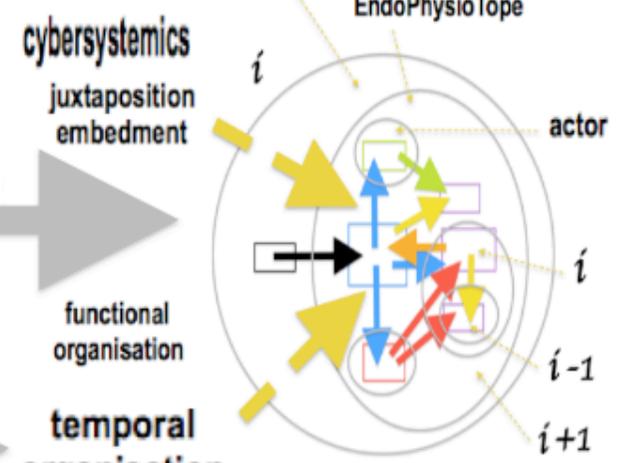
“the human glycaemia hour touring”



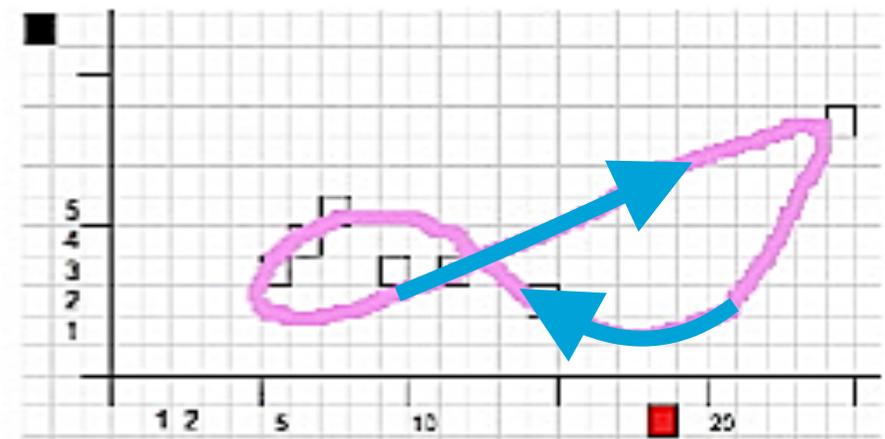
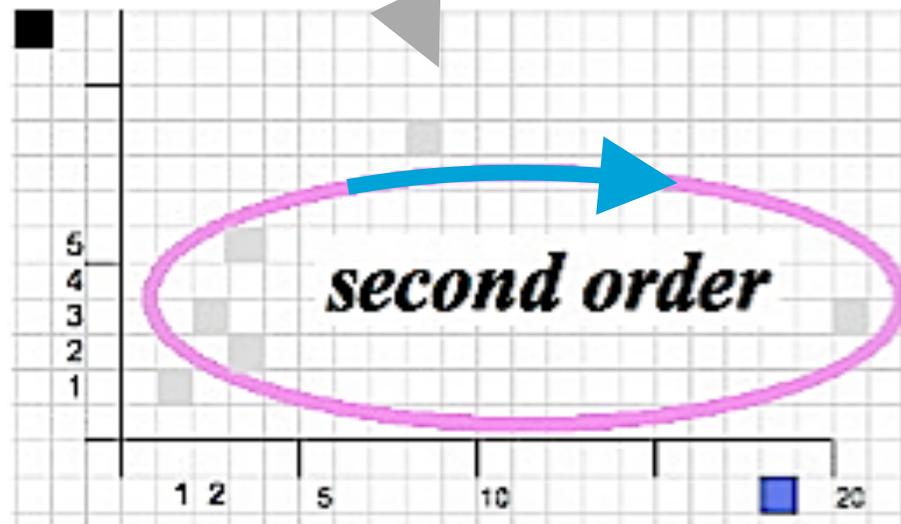
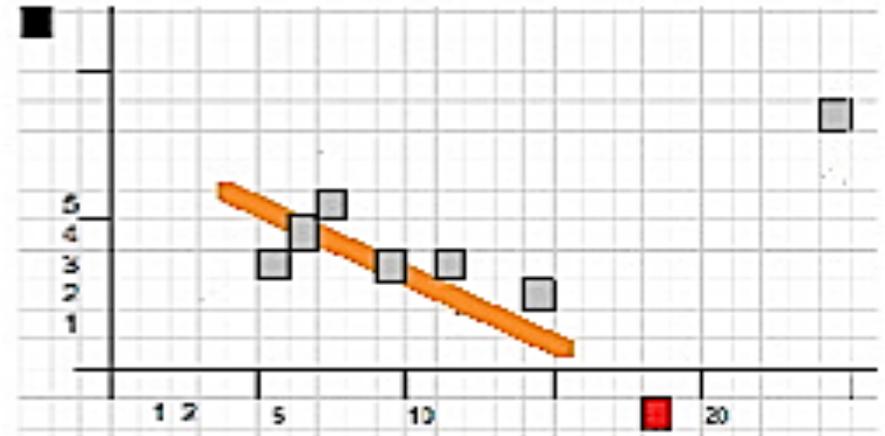
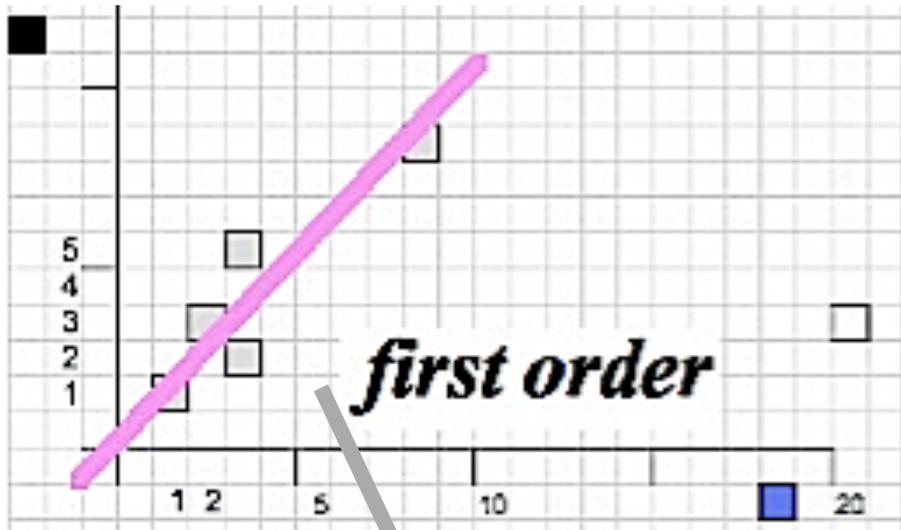
spatial organisation



interactive network



temporal organisation



The WHOLE is both more and the less than the sum of its PARTS.

$T = K$ or $ti = Ki$ **independence** of the parts ti and the whole T

$T = \sum (ki \cdot ti)$ the WHOLE is limited by the PARTS,

limiting factors of the whole, or

$ti = k'i \cdot T$ the PARTS are limited by the WHOLE,

limiting factor of the parts

The *welcome capacity* is limited by the *to be welcomed capacity*, reciprocally the *capacity to be welcomed* is limited by the *welcome capacity*.

$bT = \sum (ai \cdot ti) + K$ "The whole is bigger than the sum of the parts." (Confucius)

but it can also be the sum of its parts,

sometimes it is smaller, but mostly "it is different"!

→ **Line in 2D (n=2)** $a1 \cdot X1 + a2 \cdot X2 = K$ (which is a conic)

$X1, X2$ are the building actors, ENDO T is running in a unique way along the line.

The WHOLE is more and less than the product of its PARTS.

The simplest graphic **2D** representations are always conics or assembly of conics.

The usual space trajectory of a mobile in a field of gravity, is a conic.

The same for "the time trajectory" of a living system ENDO moving in its ECO.

Its projection on the plane (x, y) is a **CONIC**: $Ax^2 + Bxy + Cy^2 + Dx + Ey + F = 0$

x, y are the building actors, ENDO T is running in a unique way along the ellipse.

→ **Circle** $Xi^2 + Xj^2 = K^2$ (in the plane of projection Xi, Xj)

Parabola $Xi = k \cdot Xj^2 + K$

Hyperbola $Xi \cdot Xj = K$ the WHOLE is the product of the parts

(*welcome capacity*) x (*capacity to be welcomed*) = K ,

$(X1+X2) \cdot (X1-X2) = X1^2 - X2^2 = K$ in 2D (n=2)

the WHOLE is the product of the sum and the difference of the parts

→ **Ellipse** $(X1+X2) \cdot (X2+X1) = X1^2 + X2^2 + 2X1X2 = K$ in 2D (n=2)

the WHOLE is the square product of the sum of the parts.

graph of a repetitive oscillation X (1 actor)
sine wave or sinusoid
 $X(t) = A \cdot \sin(\omega t + \phi)$

A amplitude

What is the peak deviation of the function from its centre position?

ω angular frequency

How Many oscillations occur in a unit time interval t ?

ϕ phase

Where in its cycle, $t = 0$, the oscillation begins ?

parametrising of 2 antagonistic juxtaposed
running oscillations X1, X2 (2 actors) ←

$$X1(t) = a1 + A1 \cdot \cos(\omega_1 t + \phi_1),$$

$$X2(t) = a2 + A2 \cdot \sin(\omega_2 t + \phi_2)$$

→ **ellipse** if a **same EXO zeitgeber** is synchronising the 2 ENDO waves
 $\omega_1 = \omega_2$

parametrising of 3 agoantagonistic juxtaposed and embedded
running oscillations X1, X2, X3 (3 actors) ←

→ **Moebius strip**

$$X1(t) = (a + A \cdot \cos(\omega t / 2)) \cdot \cos(\omega t),$$

$$X2(t) = (a + A \cdot \cos(\omega t / 2)) \cdot \sin(\omega t),$$

$$X3(t) = A \cdot \sin(\omega t / 2)$$

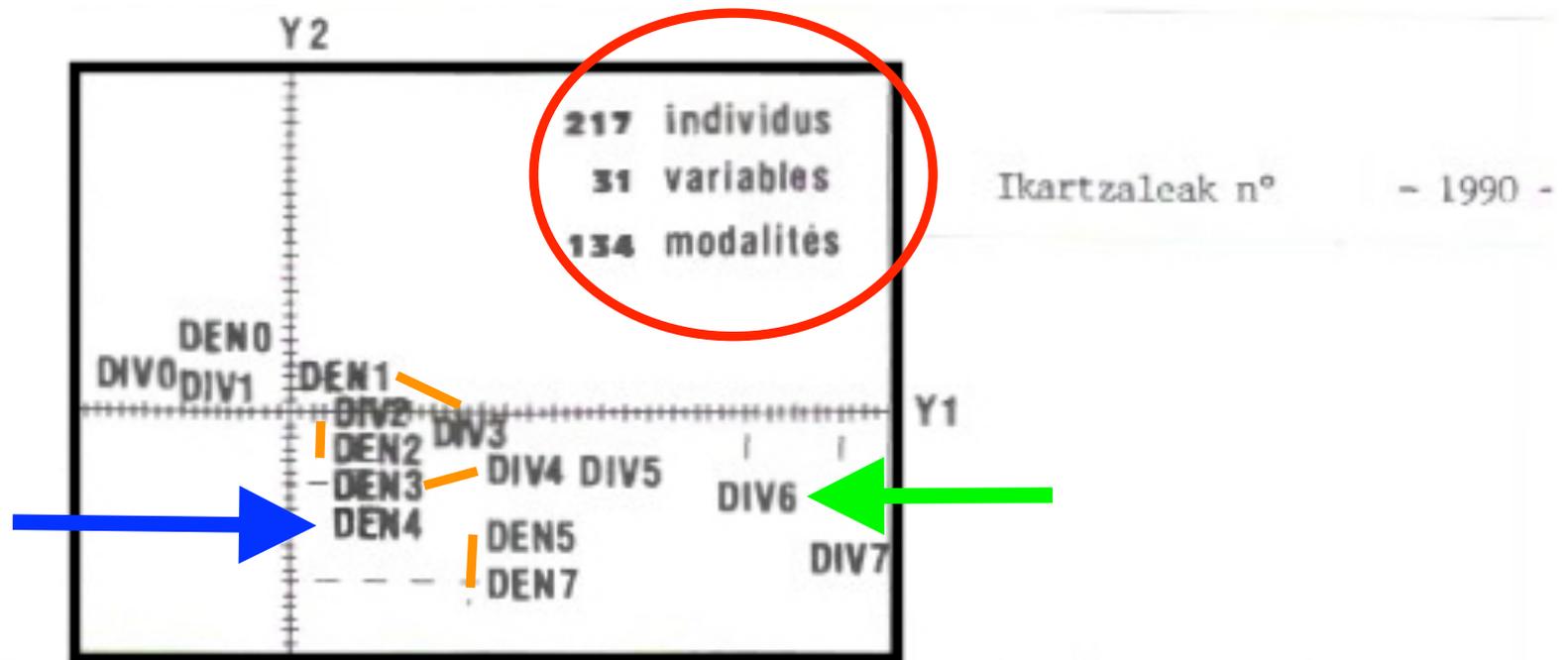


Figure 3. Description du plan des corrélations factorielles par les variables caractéristiques des cortèges de ravageurs.

DEN densité des chenilles: DENO pas de chenille, DEN1 de 1 à 40 chenilles/m², DEN2 de 41 à 80 chenilles/m² (intervalle de classe: 40 chenilles/m²), ..., jusqu'à DEN7 de 241 à 280 chenilles/m²;

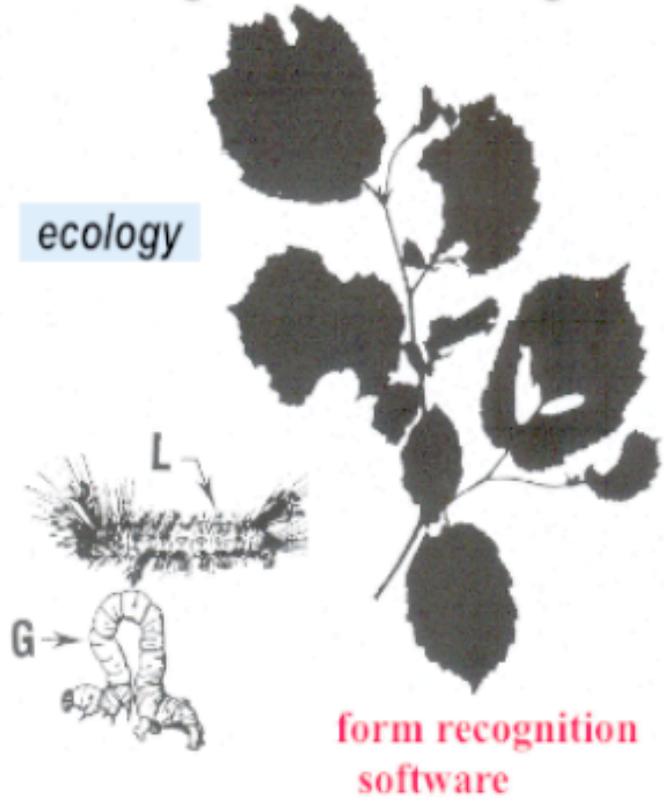
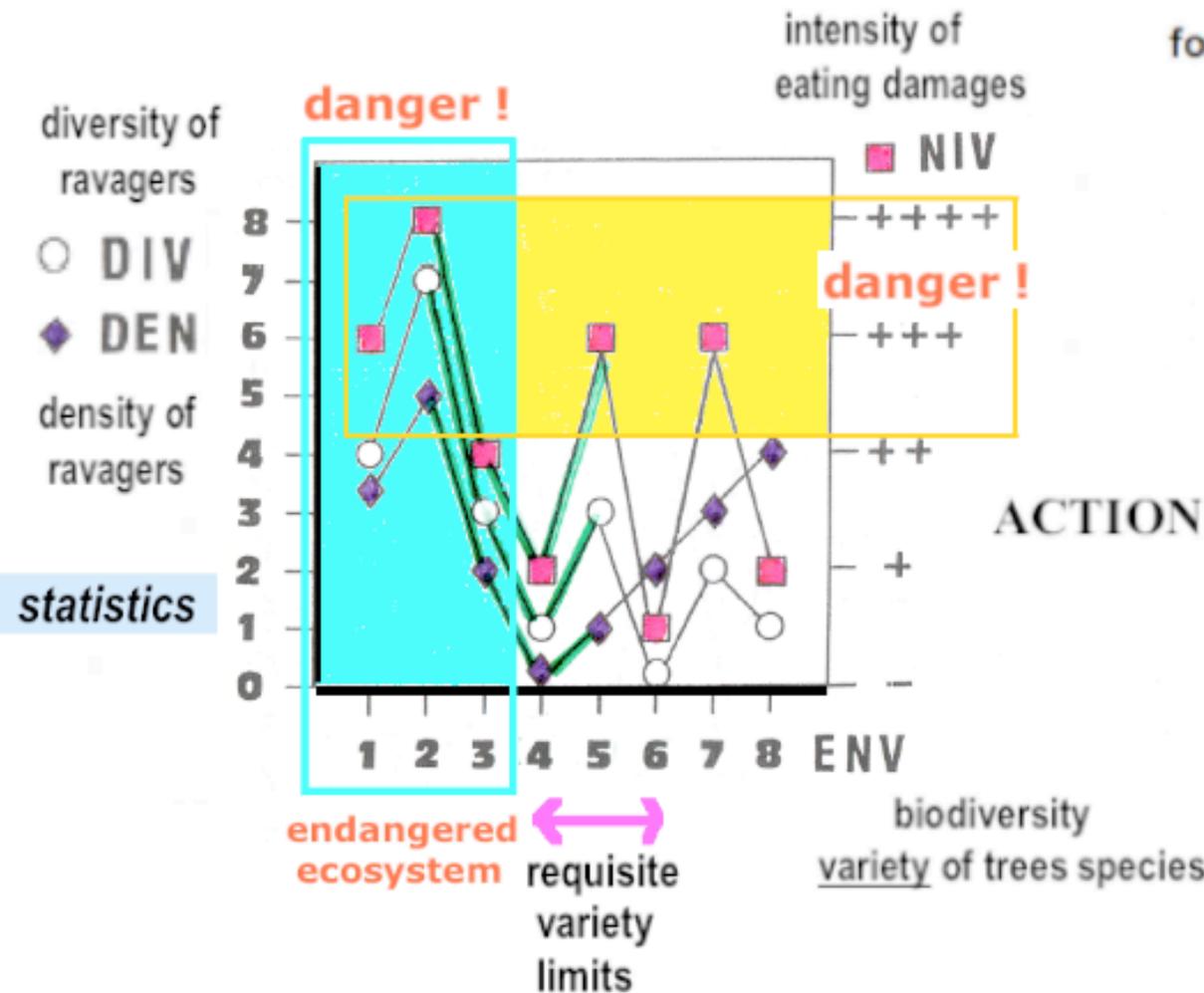
DIV diversité spécifique des ravageurs: DIV0 pas de ravageur, DIV1 1 seule espèce de ravageur présente, DIV2 2 espèces de ravageurs présentes, ..., jusqu'à DIV7 7 espèces différentes de ravageurs présentes sur le même individu d'une espèce de feuillus

références à consulter pour l'analyse factorielle: logiciel Tri-Deux (Cibois 1986), logiciel IBFX2XK (Bernard & Cibois, 1988), méthodologie informatique (Bricage, Duverger-Nedellec & Larroche, 1989)

the ACTORS, the NETWORK of interactions and the WHOLE

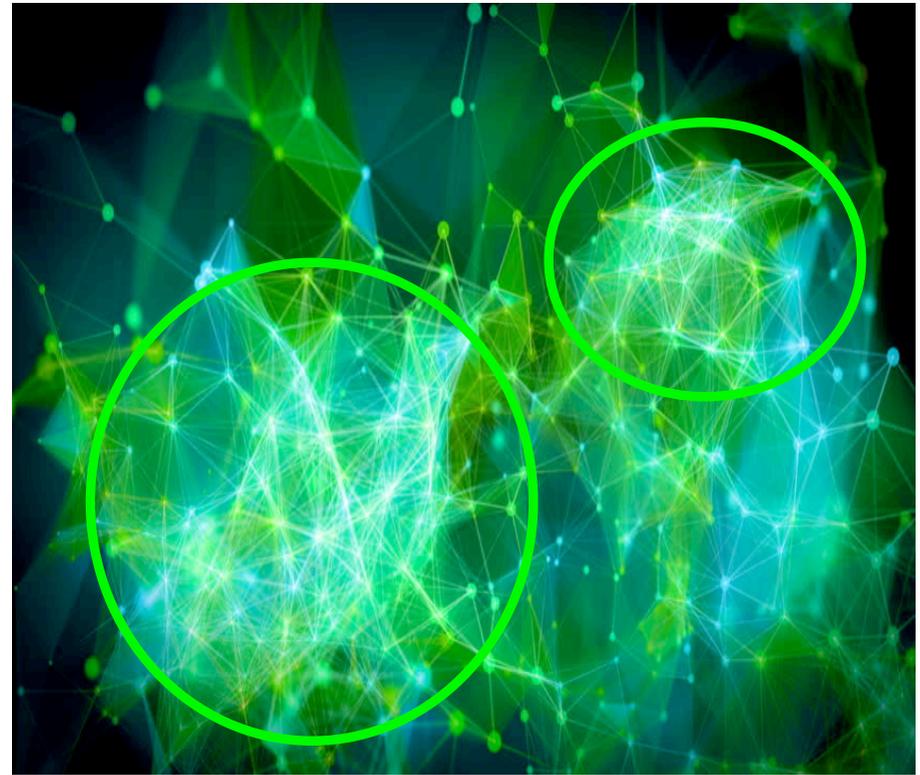
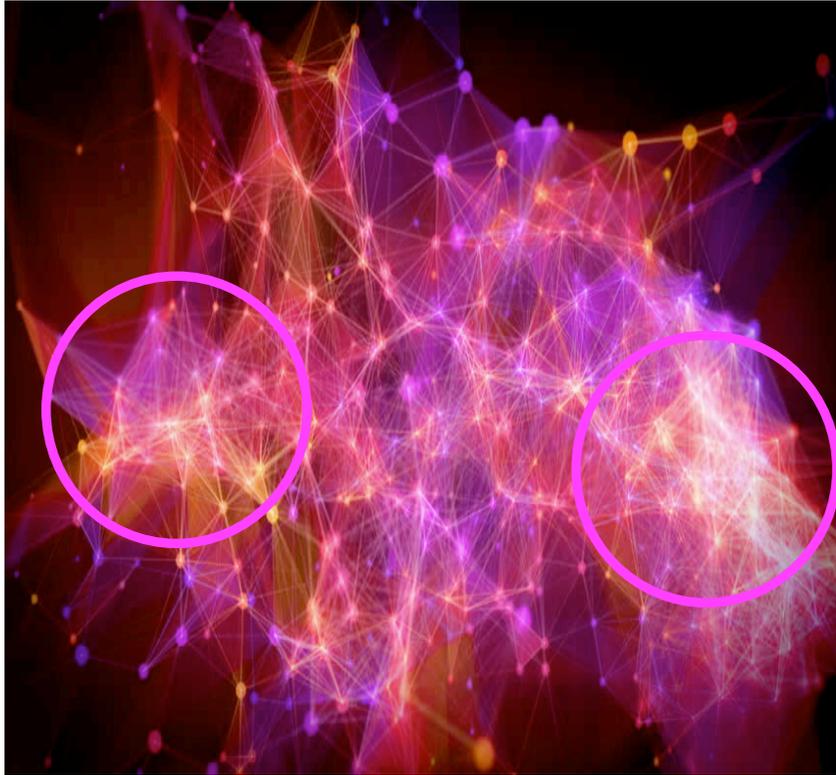
Only will survive the Associations

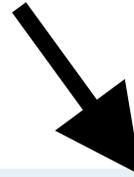
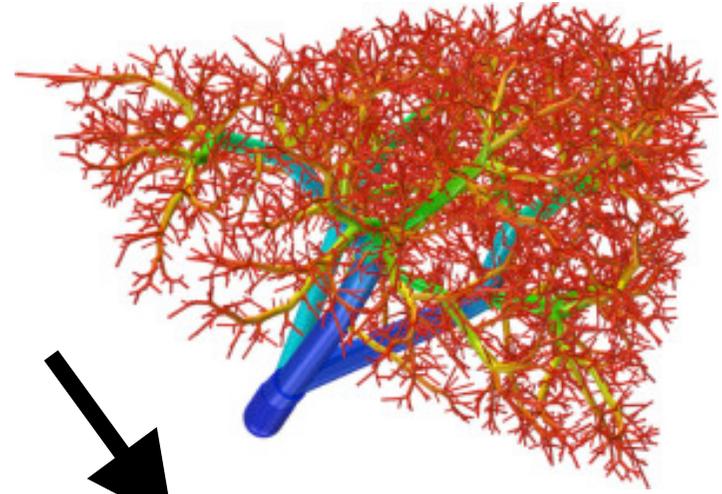
for the Reciprocal and Mutual Sharing of Advantages and Disadvantages



ARMSADA are steady states, for the maintain of organisation levels, and origins, for the foundation of new modes of integration, because they are able to save, and to extend, biodiversity



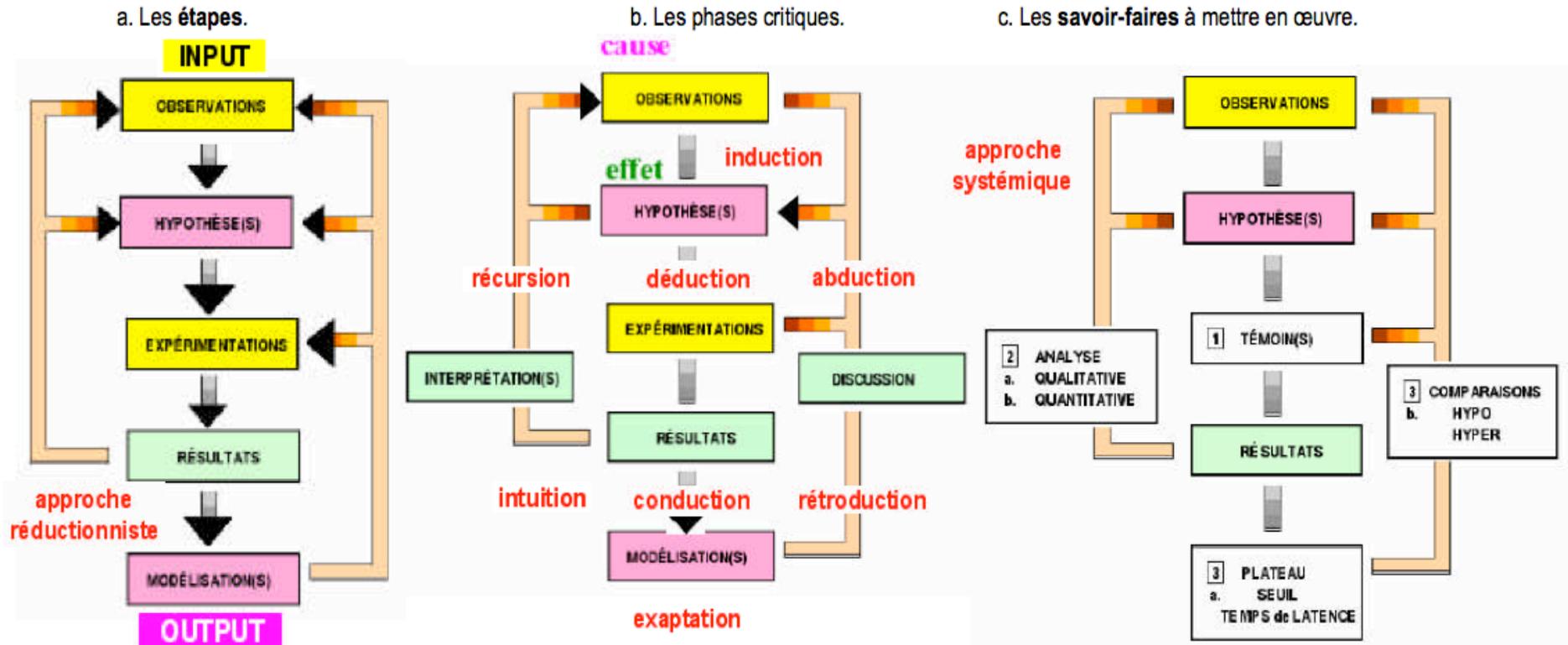




Create and print out your social network in 3D



Figure 1. La démarche scientifique expérimentale : un langage systémique.



Un système ouvert à multiples cycles de rétro-actions juxtaposés et emboîtés

Le "chemin" suivi dépend des phases d'interprétation et de discussion des résultats, et le chemin se construit en cheminant.

L'état final est contingent à la maîtrise répétée des concepts de phases et d'amplitudes, spatiales et temporelles

1, 2 a, b, 3 a, b : les différents types, de concepts et de compétences, indispensables, à mettre en œuvre pour "valider" la démarche scientifique expérimentale, et à partir desquels est évalué le "score cognitif" de l'étudiant : échelle de "niveau" de 0 à 7 (Figures 2 et 3). (voir le glossaire pour les définitions des actions cognitives)