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PLANT CLASSIFICATION AND BIODIVERSITY WHAT RELATIONSHIP IN TEXTBOOKS OF MOROCCO

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ABSTRACT: Biodiversity is rapidly declining worldwide. The main cause of the loss of biodiversity can be attributed to the influence of human beings on the world's. To protect biodiversity we need to understand it. An informed understanding of plant diversity and resources has never been more important. Environmental surveys and effective conservation strategies depend upon detailed knowledge of plants. To communicate such knowledge accurately and effectively, training is required in plant taxonomy, the discipline devoted to plant diversity, relationships and nomenclature. In Morocco, plant taxonomy is addressed in different levels of primary and secondary education. Textbooks, didactical reference tool for pupils and teachers, also address this issue. The purpose of this paper is to present the results of the analysis of pedagogical approaches used by these textbooks. The methodology used is content analysis both in the text and in images. The analyzes show that there is dominance of the functionalist classification and negligence of the utility of species. In textbooks, there is use of ecological criteria, relating to reproductive and vegetative and negligence of genetic and biochemical criteria. The pedagogical styles are often informative and explanatory. The classification of plants is not linking in an explicit way with biodiversity. Results show that pedagogical approaches fail to develop the necessary skills to classify plants include in particular the kinship between species and to classify living species in their taxa. Such pedagogical approaches does not allow the development of critical thinking required in any action of the Environmental education.

Keywords: Botanical classification, Textbooks, Biodiversity, pedagogical approach

INTRODUCTION

Biodiversity is a term that describes the variety of living beings on earth. It encompasses microorganism, plants, animals and ecosystems. In biodiversity, each species has an important role to play in ecosystem. Various plant and animal species depend on each other for what each offers and these diverse species ensures natural sustainability for all life forms. A healthy and solid biodiversity can recover itself from variety of disasters. The biodiversity is in grave danger, human beings are the most dangerous cause of its destruction.

In the last years, biodiversity has become a major focus in biological research. Its appreciation requires the identification of organisms. Classification and identification are fundamental to most biological sciences. Yet, taxonomic teaching and research have declined to a level where adequate support for the other sciences can no longer be sustained. New teaching initiatives are needed, combined with the provision of suitable resource materials and identification guides.

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Textbooks represent one of the pillars of formal education and they influence the content, the approach and the teaching style (caravita 2008). This paper aims to study how plant classification and biodiversity are treated in textbooks.

METHODS

This study is mainly qualitative, our methodology is based on a content analysis of textbooks. The analysis we propose is guided by two questions:

- How Biodiversity and the plant classification are treated and also what are the links between these topics?
- What is the approach taken to address these issues?

In the analysis, we have used a grid designed and validated by the BIOHEAD project consortium (caravita 2008)

Corpus

We have analyzed textbooks of scientific Common Core (level 10) and those of second year of baccalaureat (level 12). These levels correspond to different times where biodiversity and plant classification are treated in secondary education. The analyzed textbooks are some of the commonly used textbooks and all correspond to Life and Earth sciences' programs currently applied in Morocco. The textbook analysis had dealt on text and images.

RESULTS

In analyzed textbooks, Biodiversity topic was dealt at ecosystem, species and the genetic level, in this order from one grade level to the upper one. Throughout the scientific Common Core's textbook, a multitude of species are described whether animal and plants. Species diversity is related with habitat diversity modulated by environmental factors and trophic relationships.

Species diversity is also studied at the level of reproduction. The manual gives many examples of reproduction modes (sexual and asexual) only in plants. The specific diversity is also shown in the study of plant classification (morphological diversity, life cycle ...) (Figure 1).

Chêne vert	Cèdre de l'Atlas	Polypode vulgaire	Funaire hygrométrique	Fucus vésiculeux	
النباتات					Règne مملكة
نباتات زهرية Spermatophytes (ou Phanérogames)		مستورات الزهر الوعائية Ptéridophytes	حزازيات Bryophytes	طحالب ملونة Hétérochontophytes	شعبة Embranchement
كاسيات البذور Angiospermes	عرايات البذور Gymnospermes	مرخسيات Fougères	حزازيات Mousses	طحالب سمراء Phéophytes	تحت الشعبة Sous Embranchement
Magnolopsida (Dicotylédones)	Coniféropsida (Pinopsidées)	Filicopsida (Filicopsidées)	Funariopsida (Bryopcidées)	Fucopsida (Fucophycées)	طائفة Classe
Fagales	Pinales	Polypodiales	Bryales	Fucales	فصيلة Ordre
Fagacées	Pinacées	Filicophycées	Briophycées	Phéophycées	عائلة Famille
Quercus	Cedrus	Polypodium	Funaria	Fucus	جنس Genre
ilix	atlantica	vulgare	hygométrica	vésiculosus	نوع Espèce

Figure 1: Plant diversity related to the reproduction mode

Biological diversity is largely addressed by activities related to the classification of living beings. It is very present in textbooks, it is the application of a stereotypical nesting method unrelated to evolutionary concepts. This can lead to focus on the classification as a product using contingent criteria.

All the textbooks analyzed reflect this difficulty since they incorporate evolution through the notion of kinship. They evoke the notion of kinship only in activities "plus the number of common attributes shared by two species is important, more they are close parent" (Figure 2).

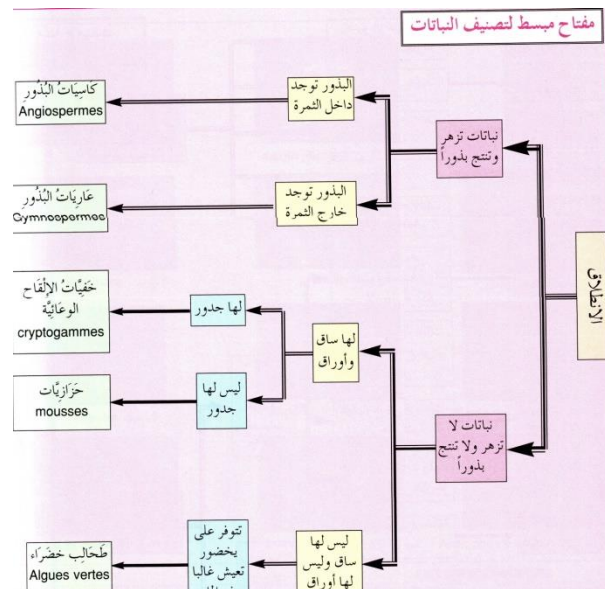


Figure 2 : Plants classified in Taxa, genre and species.

No explicit link between classification activity and the preservation of biodiversity. Students do not understand the usefulness of the classification. The relationship between biodiversity conservation and phylogenetic classification is entirely absent. Generally, textbooks are few links between disciplinary knowledge of biology and biodiversity protection leading to a very functionalist vision.

CONCLUSION

It is therefore important that students through textbooks, can build the knowledge and methods to classify living in a clear conceptual framework: biological evolution. This is all the more necessary it is with rare exceptions of a new knowledge that replaces the old and unstable knowledge.

The treatment of plant classification in textbooks must have a purpose and explicit goals and must be linked to the preservation of biodiversity, if not students do not understand the interest to learn technical jargon (criteria used in the determination keys) to give a name to a plant (Andekrson & al 2014 ; Barman & al 2006).

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