# MORPHOLOGICAL AND FUNCTIONAL ORCHIDACEAE CHARACTERISTICS AS A SUPPORTING MATERIAL FOR TEACHING OF BOTANY

# CARACTERÍSTICAS MORFOLÓGICAS E FUNCIONAIS DE ORCHIDACEAE COMO MATERIAL DE APOIO AO ENSINO DE BOTÂNICA

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## ABSTRACT

Many difficulties are encountered in the assimilation and fixation of botany subjects, due to its terminological complexity and subareas. Thus, didactic games and playful activities can help in teaching-learning of these subjects. In this way, the *"A memória das Orquídeas"* game was made, together with the discipline *"Disseminating and Popularizing Science in UNESP: Interaction between post-graduation and basic education - Investigating the plants life"*, in which structural and environmental aspects along with functional characteristics of Orchidaceae family were addressed, aiming to collaborate with the teaching of terms used in botany. Game evaluation was made for Biological Sciences students, which answered a questionnaire evaluating the applicability, form of presentation, and botanical terms use. The students believed that playful activities fulfill their role, contributing for the best understanding of this group of plants whose importance is many times unknown. The game was considered interesting and dynamic for the understanding of concepts in morphology and physiology, suggesting its use as a teaching strategy for botany concepts, in a stimulating and fun way.

**Keywords:** Didactics games. Orchidaceae. Botany concepts.

## RESUMO

Muitas dificuldades são encontradas na assimilação e fixação dos conteúdos de botânica, devido a toda sua complexidade terminológica e subáreas. Portanto, jogos didáticos e atividades lúdicas podem auxiliar no processo de ensino e aprendizagem. Dessa forma, o jogo *"A Memória das Orquídeas"* foi confeccionado junto à disciplina *"Difundido e popularizando a ciência na UNESP: Interação entre a pós-graduação e o ensino básico - Investigando a vida das plantas"*, abordando aspectos estruturais e ambientais em conjunto com características funcionais da família Orchidaceae, visando colaborar com o ensino de termos utilizados em Botânica. A avaliação do jogo foi feita por estudantes de Ciências

Biológicas, que responderam a um questionário avaliando sua aplicabilidade, forma de apresentação e utilização de termos botânicos. Os alunos acreditam que jogos lúdicos cumprem esse papel, contribuindo para ampliar o conhecimento sobre esse grupo de plantas, cuja importância é muitas vezes desconhecida. O jogo foi considerado interessante e dinâmico para o entendimento dos conceitos de morfologia e fisiologia, sugerindo sua adoção como estratégia de ensino para conceitos de botânica, de forma estimulante e divertida.

**Palavras-chave:** Jogos didáticos. Orchidaceae. Conceitos de Botânica.

Didactics games are one of the most effective activities to fixation and subject review, principally when they are compared to conventional practice applied in class room (FERREIRA, 1998). In this context, botany studies contemplate the meticulous observation of plant as a whole, and difficulties are frequently reported by students and teachers during the teaching-learning process (FIGUEIREDO, 2009). For students, it is by the fact the subject of area to be worked, many times, in an unbound and subdivided way, being often charged theoretical conceptions with excessive terminologies; and for teachers, it is justified because they often have to follow an embedded programmed subject, which leads to an overly systematic approach (REINHOLD et al., 2006).

Therefore, when the aim of the teaching-learning process are only restricted to specific knowledge and it is decontextualized of the student reality, the teacher stops collaborating for the conquest of your autonomy, and the student stops developing critic sense (WACHOWICZ, 1995). In this sense, the didactic games enter as instruments that allow capturing the interest of the students in relation to determined subject addressed, arousing interest, satisfaction and motivation, resulting in a fun, spontaneous and efficient way of learning. In addition, it stimulates problem solving, critical thinking, the ability to interpret and, consequently, assimilation and fixation of subject (CAMPOS; BORTOLOTO; FELÍCIO, 2003).

That because, between your various subareas, plant physiology due to its high level of complexity, exhibit a challenge on the teachers in having to pass on information which can

illustrate various stages of plants metabolic functioning, mainly relating with the environment and ecosystem that they are living. Plant anatomy subarea is also lacking in games and play activities which can complement the teaching-learning process in addition to expositive and practical classes, having few complementary instruments in this sense, such as atlas (GONÇALVES; MORAES, 2011) and didactic album (OLIVEIRA et al., 2009).

Aiming to evaluate the use of didactic games as an instrument for fixation, revision and teaching of botany, taking into account the intention of transforming abstract subjects in easily assimilated subjects in classroom, the Orchidaceae family was chosen as a model for such activity. It is because they are one of the most diversified families in plant kingdom, with a significant economic importance and constantly cited as a reference in conservation projects (JUDD et al., 1999). In addition, the environment variations resulting from the habitats diversity that plants occurs, contributed to generate very peculiar structural and physiology strategies in vegetative organs (PABST; DUNGS, 1975).

In this sense, "*A Memória das Orquídea*s" game was made to better address such characteristics, widely discussed during the "Plant Morphology I" discipline, at the Universidade Estadual Paulista "Júlio de Mesquita Filho" (UNESP - *Campus* Botucatu). This idea emerged as a final product of the discipline *"Disseminating and Popularizing Science in UNESP"*, whose mission is to transmit knowledge of the most diverse areas in an inter-structured, playful and easy-to-understand way to students. In the game, two kinds of pieces were made: a) 17 cards showing structural images (hypodermis, thick cuticle, idioblast, velamen, exodermis, rhizome, parallel veins, pseudobulbs, aerials roots, flowers, fruit – capsule and seeds), growing type (sympodial or monopodial structure) and habitat (epiphytic, rupicolous, and terrestrial orchids) of *Orchidaceae* in one side, and also b) 17 cards showing descriptions about the characteristics (function) of these structures (Fig.1). For start playing, the game requires at least two players and all cards must be placed with the images and

descriptions facing down so that can be not seen. Each player must, in your turn, turn two pieces and let everyone see that. If the cards are complementary (structure/growing type/habitat with characteristics), the player must show for the other players, collecting for itself this pair and being able to play again. If the cards are not complementary, they must be turned over again and passed to the next player. The winner is who get the highest pair of

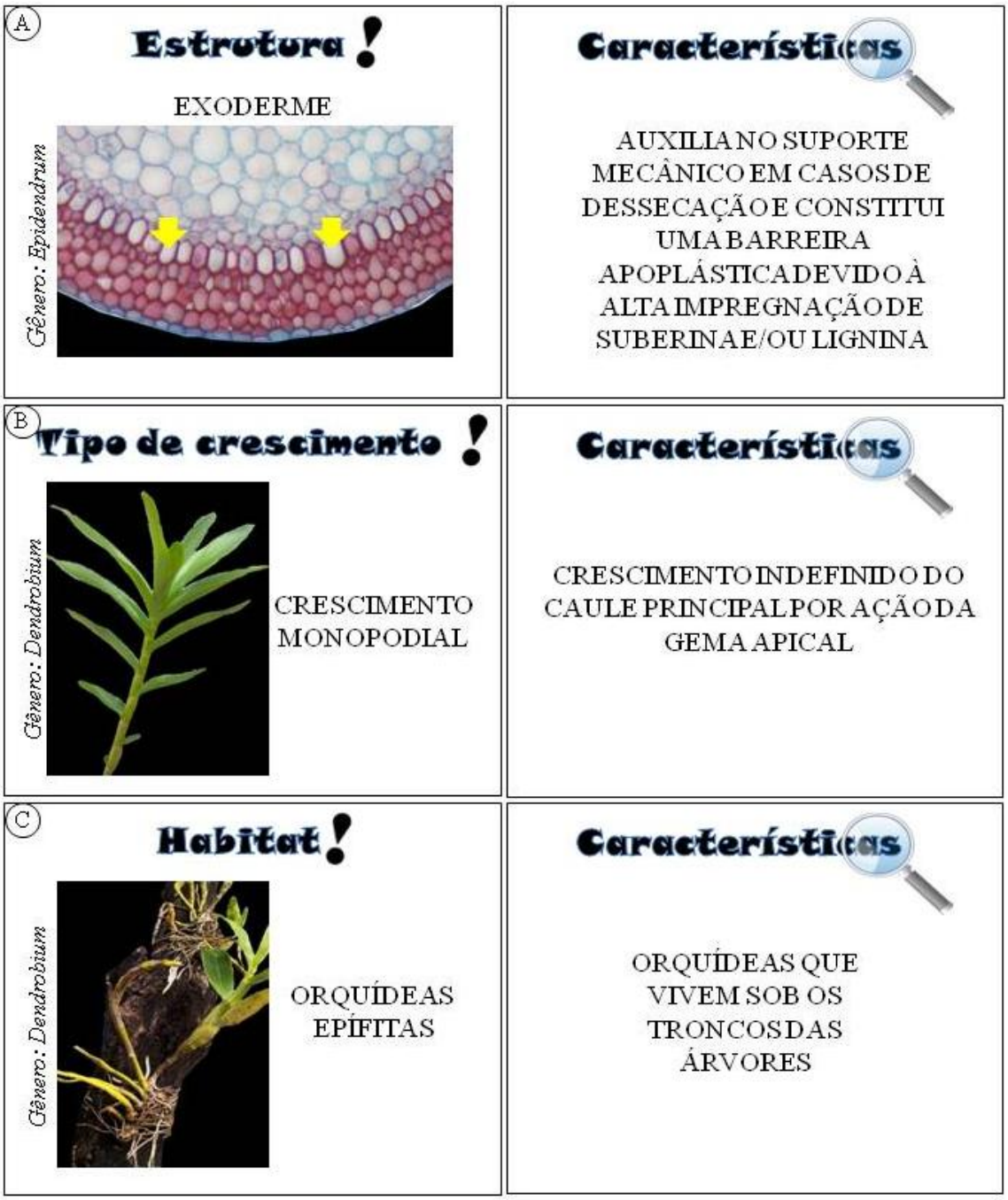


**Figure 1**. Different types of "A Memória das Orquídeas" game cards. **(A)** Image showing one card of plant anatomy with your complementary card. **(B)** Image showing a growing type card with your complementary card. **(C)** Image showing a habitat card with your complementary card.

cards at the end of the game.

*"A Memória das Orquídeas"* was applied in second grade students of Biological Sciences of UNESP - *Campus* Botucatu (Fig.2). During the game application, the authors stayed available for take doubts, and giving support for the game functioning. At the end of the game, a questionnaire with seven questions was applied to the students, evaluating the applicability, the form of presentation, and the impact of revision and fixation of discussed subjects (Table 1). The questionnaire was applied because it is an evaluation method applied in the most diverse areas, and is based on concrete and formal parameters of benefits provided by educational games (HAYS, 2005).

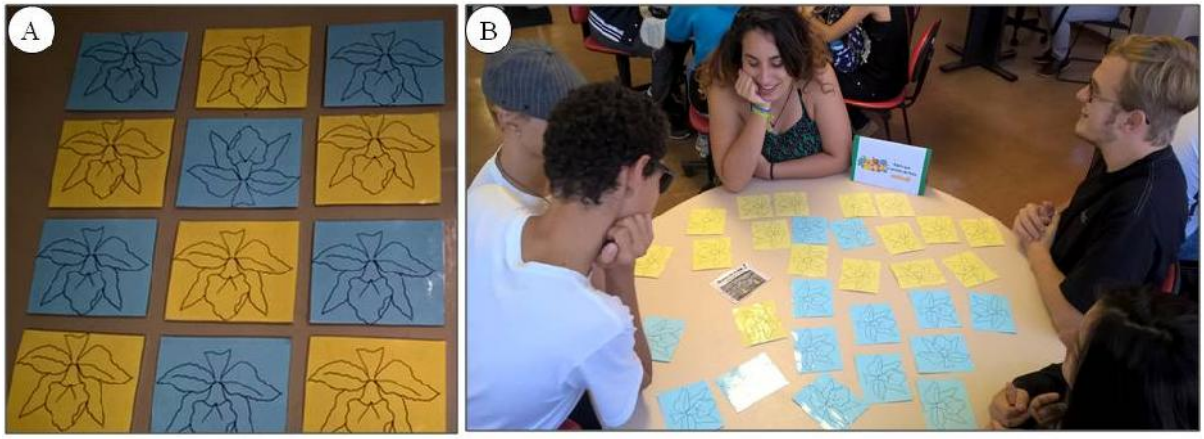


**Figure 2**. Image showing "A Memória das Orquídeas" game being applied to the second grade Biology students. **(A)** Cards willing before the game beginning. **(B)** Students at the moment of the game application.

**Table 1.** Questionnaire for evaluate the game "A *Memória das Orquídeas*"

| **Questions** |
|---|
| 1) Do you believe that educational games can contribute to botany teaching? |
| 2) Do you believe that this game contributes to part of Plant Morphology subject review? |
| 3) Do you believe that this game could be applied as a subject fixation form? |
| 4) Did you have any previous knowledge about the orchids characteristics before the contact with this game? |
| 5) Do you think interesting to approach the orchids characteristics? |
| 6) What is your contact with the orchids? (Have you ever cultivated? Do you have at home? Are you curious about the family?) |

7) Give a score from 0 up to 10 for the game and make suggestions or criticism.

In totality, the students said they believe that playful games can contribute not only for botany teaching, but also for review and fixation of plant morphology subject part. Ninety percent of the students who participated of the game had some previous knowledge of orchid characteristics, and they believe that these plants are present in our daily life, whether for their diversity, ornamentation, beauty and/or popular acclaim. All of them believe that the game also contributes to the better knowledge of this plant group, which the importance is underestimate. In the game evaluation, "*A Memória das Orquídeas*" reached a total of 9.8 points in the acceptance and incentive to its application in appropriate moments during the classes.

The authors believe that the use of this game and other games, which stimulate students through the playful educational, can fulfill the mission of transmitting knowledge and transform the reality, educating for citizenship (CHASSOT, 2003). And, as Figueiredo, Coutinho and Amaral (2012) proposes, we, biology teachers, begin to seek pedagogical practices and botanical curriculum contextualized with the cultural, political, economic and mainly environmental students realities. Moreover, it is the opportunity to apply teaching-learning activities in botany that do not depend exclusively on visits to spaces such as parks, gardens, forests, and biological reserves, since these field trips are often not feasible, mainly by financial resources.

In summary, the game can be suggested like a strategy to make the botany teaching more stimulating, seeking to provide value to environmental theme and making the student have the opportunity to access a complementary reality as important as subject approached formally in the classroom (VIEIRA; BIANCONI; DIAS, 2005).

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