SALINIZATION IN NORTHEAST SOILS IN THE VIEW OF ACADEMICS IN BIOLOGICAL SCIENCES

A. T. Reis[1], O. H. Bonilla[2], C. F. de Lacerda[3], D. P. de Oliveira[4], F. E. Y. de C. Dias[5]

SUMMARY: The training of qualified professionals requires skills to perform specific functions, incorporates theoretical, technical and operational knowledge. Thus, it must be seen as a determining factor for the future of those who are seeking a job placement. Currently the problems of soil degradation in the Brazilian northeast are evident, the processes of salinization compose these problems. The research analyzed the perception of the students of Biological Sciences of the State University of Ceará on the processes of salinization of the soil. A questionnaire with 20 questions (closed and open) was applied to 60 students with students from the first two semesters and students at the end of the course who accepted to participate in the research. The content of the questions addressed the processes of salinization of soils, origins, causes, consequences, alternatives of control and importance of the subject. The results showed that most of the students, especially the students of the first semesters of the course, have a deficiency in the identification of the degradations, causes, occurrence, areas most affected by the problem of salinization of the soils. Despite the large participation of students in the closed answers, more than 60% of the students answered "I do not know" to discursive questions, where they would have to argue about "origins of salinization", "how a soil becomes saline", "how man can induce salinization", " What are the consequences of salinization".

KEYWORDS: Professional biologist, semiarid, salinity.

A SALINIZAÇÃO NOS SOLOS DO NORDESTE NA VISÃO DE ACADÊMICOS EM CIÊNCIAS BIOLÓGICAS

RESUMO: A formação de profissionais qualificados requer habilidades de executar funções específicas, incorpora conhecimentos teóricos, técnicos e operacionais. Assim, deve ser vista como fator determinante para o futuro daqueles que estão buscando uma colocação no mercado de trabalho. Atualmente são evidentes os problemas de degradação do solo no nordeste

[1]Acadêmica de Ciências Biológicas da UECE, Fortaleza - Ceará. Email: ane.teles@aluno.uece.br
[2] Doutor, Pesquisador da UECE, Fortaleza - Ceará. Email: oriel.herrera@uece.br
[3] Doutor, Pesquisador do INCTSal e do PPGEA da UFC. Email: claudivan_@hotmail.com
[4] Acadêmico de Química da UECE, Fortaleza - Ceará. Email: pereira.oliveira@aluno.uece.br
[5] Mestrando MARENA/UECE, Fortaleza - Ceará. Email: yagocastro2602@hotmail.com

brasileiro, os processos de salinização compõem esses problemas. A pesquisa analisou a percepção dos alunos de Ciências Biológicas da Universidade Estadual do Ceará sobre os processos de salinização dos solos. Foram aplicados para 60 alunos um questionário com 20 questões (fechadas e abertas) com alunos dos dois primeiros semestres e alunos do final do curso que aceitaram participar da pesquisa. O conteúdo das perguntas abordou os processos de salinização dos solos, origens, causas, consequências, alternativas de controle e importância do assunto. Os resultados mostraram que a maioria dos alunos, principalmente os alunos dos primeiros semestres do curso, têm deficiência na identificação das degradações, causas, ocorrência, áreas mais atingidas pelo problema de salinização dos solos. Apesar da grande participação dos alunos nas respostas fechadas, mais de 60% dos alunos responderam "não sei" para perguntas discursivas, onde teriam que argumentar sobre "origens da salinização", "como um solo se torna salino", "como o homem pode induzir a salinização", "quais as consequências da salinização".

PALAVRAS-CHAVE: Profissional biólogo, semiárido, salinidade.

INTRODUCTION

Brazilian educational policy regulates the training of professional teachers in the country. By law, undergraduate courses aim to train teachers for basic education. The Law on the Guidelines and Bases of National Education (BRASIL, 1996) was one of the credits for the intensification of the debates about teacher education in Brazil.

The teaching of Science and Biology is one of the areas within the scope of the degrees. In Brazil, this area still has many problems pointed out in the literature (AMARAL 2000; KRASILCHICK 2000), we still have an initial deficient teacher training, bringing losses in the various educational environments.

The new proposal for a National Curricular Common Base (BNCC) comes with the discourse of changing the educational paradigm. Students should acquire a base to discuss cross-cutting themes such as economics, environment, energy resources and food, and exercise their citizenship through a process of scientific and technological literacy promoted during this stage of learning (BRAZIL, 2015). In this perspective, education professionals should be adequately qualified to promote these debates.

A subject that is inserted in the environmental theme is the salinization of the soils that brings great economic and social damages, which can cause desertification and biodiversity

decline (RAMOS et al., 2013), so this theme should be worked on in schools in a way that Students to understand reality and act upon it (BRASIL, 1999).

In the northeast of Brazil due to its semi-arid climate with scarce rainfall and poor management of agriculture, soil salinization processes are generating serious problems (PEDROTTI et al., 2015). Wanderley (2009) mentions that for this region to present water deficit there are no favorable conditions for leaching to occur. With evaporation exceeding and much precipitation, the drainage of the soluble salts is deficient, which contributes to the accumulation of these salts in the profile and the surface of the soil, resulting in soils affected by salts.

In scientific research the subject is much discussed, however in the researches in education it is not common to find literature that deals with the subject like main subject. Therefore, the objective of the research was to analyze the perception of academic graduates in Biological Sciences of the State University of Ceará on soil salinization processes.

MATERIAL AND METHOD

The present work was based on a descriptive research, by survey, collecting information from all the members of the universe surveyed, with quantitative character (GIL, 2010).

A research project at the State University of Ceará (UECE), located in the Itaperi district of Fortaleza, Ceará, Brazil, with volunteer students of the Full Degree in Biological Sciences of the State University of Ceará.

The research instrument for a questionnaire with 20 questions, questions divided into objective questions of multiple choices with items A, B, C and D, subjective questions and personnel questions, that present a question to the interviewee.

The data were collected in February 2017, through questionnaires applied in the classroom to the students of the Full Degree in Biological Sciences who accepted to participate in the research, 30 students of the first and second semester of the course and 30 students of the sixth and seventh. The sample chosen was according to the number of places that are offered for enrollment in the first semester.

The content of the questions addressed the soil salinization processes, the causes and consequences of this process. Personal questions addressed the importance of subject and visualization within academia and basic education.

The results were fed into the Excel program for quantitative analysis. Tables and graphs were made. The analysis of variance and Tukey's test were applied in a completely randomized

experimental design, with two treatments and 30 repetitions using the software Assistat 7.7 beta.

Due to the ethical aspects, the Free and Informed Consent Term was applied and signed by the students who accepted to participate in the research.

RESULTS AND DISCUSSION

After the analysis of the number of correct answers of the two groups of students asked about several subjects related to the processes of salinization of the soils, a statistical difference was evidenced at the 5% probability level by the Tukey test between the groups.

The students of the last semesters of the course had a greater average of accuracy in the objective and subjective questions, in relation to the students of the first semesters. Even the students of the last semesters had a number of answers below half the total number of questions (14), indicating lack of knowledge or little interest in the subject (Fig. 1).

These results resemble those found by Trindade (2004); Giassi (2009) that made on international research with a perception of teachers and students of basic education on topics of major interest. These authors verified that there is a greater interest in everyday control, such as those directed toward the body and health, as these are areas with which they are in direct contact. This possibly explains why the low percentage of correct answers in the subject addressed in this research, because it is farther from the reality with which they relate in the day to day.

In one of the questions addressed in the questionnaire the students were asked "Which salts are present in the saline soil". Item "b" expresses the correct response (salts such as NaCl, $CaCl_2$, $MgCl_2$, Na2SO_4 and $MgSO_4$). It was found that 60% of the students of the first years erred in this question. More than half (57%) of the students of the last semesters marked the correct answer (Fig. 2).

This result clearly demonstrates the need for further research in the chemistry disciplines in higher education on the negative repercussions that certain types of chemicals can cause to the environment, in this case on the ground, when handled incorrectly, since the students evaluated did not know how to identify the Salts present in the saline soil.

In one of the discursive questions, the highest number of correct answers was in the group of students of the last semesters with 10% of the answers (Fig. 3). The question asked: "What is the difference between primary and secondary salinization?" This was the questioning of students. Over 90% of students in both groups did not answer the question.

In the next discursive question was asked: "How does a soil become saline". The answers, in general, were implicit in the answers to the objective questions even so the majority of the students did not formulate complete answers. In the first semester, 97% did not respond or gave incomplete answers. As the most quoted answers were: "*increases non-soil salts and agriculture"*. Among the students of the last semesters were 60% who left the responder, or gave incomplete answers. As the main writers written by the group of groups: evaporation, erosion and anthropic actions.]

The question discussed below is personal, 93% and 63% of the students of the first and last semesters respectively (Fig 4).

In 2001, Delizoicov argued on the importance of problematizing knowledge, aiming to sharpen as contradictions, that is, there is a need for future professionals of questions, criticisms about concepts and analysis of criticism. The problematization implies a choice and formulation of a problem that is significant for the student, most of the solutions needed to obtain knowledge. It is a process whereby the teacher, "while grasping the prior knowledge of the students, promotes their own discussion in the classroom, with the purpose of finding possible contradictions and limitations of the knowledge that are being explained by students, be Questions them too "(DELIZOICOV, 2001).

According to Gohn (2006), education presupposes collectively constructed environments and interactive situations, in a process where learning enables individuals to organize themselves with community objectives, aimed at solving everyday collective problems, and that content learning enables individuals to do a reading of the world from the point of view of understanding what is going on around you.

The students were asked about the importance of dealing with the subject of soil salinization, more than 90% of the students of the two groups answered that it is important to address the issue, justified with several answers such as avoiding desertification, improving life in the region, reducing impacts Socioeconomic and etc. This demonstrates that they are aware of the need to address the issue addressed. However, only 1.6% of the total students analyzed in the research described the importance of well-known education professionals to the respect. In this way it is clear that the problem tends to worsen, insofar as this segment of society does not know the root of the problem.

This demonstration is also a necessity of practitioners and authorities in education handled the subject from basic education and to train licensed professionals able to develop cross-cutting themes producing classroom discussions in the most diverse school years.

CONCLUSIONS

The two groups of students demonstrated a deficiency in the argumentative development on the processes of salinization of the soils, a subject encompassed in the environment, transversal theme that should be treated since the basic education.

The students of the last semesters are more able to answer questions related to the subject in question.

The results of the two groups of students demonstrate the deficiency within the education system.

Students know the importance of addressing the subject in an academic setting.

BIBLIOGRAPHIC REFERENCES

AMARAL, I. A. Currículo de Ciências: das tendências clássicas aos movimentos atuais de renovação. In: BARRETO, E. S. S. (org). **Os currículos do Ensino Fundamental para as Escolas Brasileiras.** 2 ed. Campinas, SP: Autores associados; São Paulo: Fundação Carlos Chagas, 2000.

BRASIL. Ministério da Educação. **BASE NACIONAL COMUM CURRICULAR**. 2015. Disponível em <http://basenacionalcomum.mec.gov.br/>. Acesso 10 Jan. 2017.

BRASIL, Ministério da Educação, Secretaria de Educação Média e Tecnologia. **Parâmetros Curriculares Nacionais:** Ensino Médio. Brasília: Ministério da Educação, 1999.

BRASIL. **Lei n. 9.394 de 20 de dezembro de 1996** – Estabelece as Diretrizes e Bases da Educação Nacional. Brasília/DF, 1996.

DELIZOICOV, D. Problemas e Problematizações. In: PIETROCOLA, Mauricio (organizador) **Ensino de Física**: Conteúdo, metodologia e epistemologia numa concepção integradora. Florianópolis: UFSC. Pag. 125-150. 2001.

GIASSI, M. G. **A contextualização no ensino de biologia:** um estudo com professores de escolas da Rede Pública Estadual do Município de Criciúma-SC. Tese (Doutorado em Educaçao Científica e Tecnologica). Universidade Federal de Santa Catarina. Florianópolis – SC, 2009.

GIL, A. C. **Como elaborar projetos de pesquisa**. 5ª Ed. São Paulo: Atlas, 2010.

GOHN, M. G. Educação não-formal, participação da sociedade civil e estruturas colegiadas nas escolas. **Ensaio: aval. pol. públ. Educ**., Rio de Janeiro, v.14, n.50, p. 27-38, jan./mar. 2006.

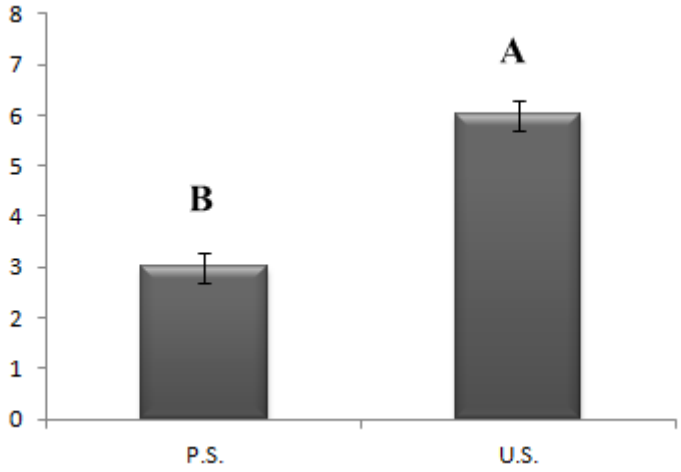
KRASILCHIK, M. **Reformas e realidade:** o caso do ensino de ciências, São Paulo em Perspectiva, 14(1) 2000.

RAMOS, C. M. C.; BARROS, F.L.L.; GALVÃO, S.R.S.; BRITO, F.B. **Variabilidade espacial da salinidade do solo em área de agricultura irrigada**. Botucatu: SGeA. p. 1-6. 2013.

PEDROTTI, A.; CHAGAS, R.M.; RAMOS, V. C.; PRATA, A. P. N.; LUCAS, A. A. T.; SANTOS, P. B. Causas e consequências do processo de salinização dos solos. **Revista Eletrônica em Gestão, Educação e Tecnologia Ambiental Santa Maria**, v. 19, n. 2,, p. 1308-1324. 2015.

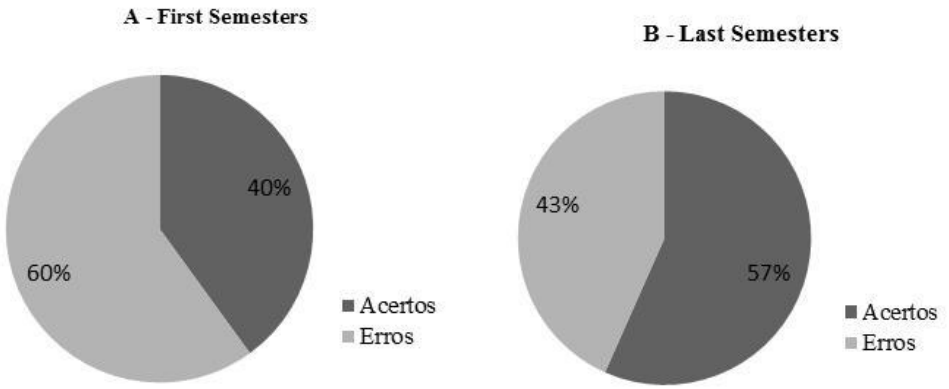
TRINDADE, I. L. **Interdisciplinaridade e Contextualização no "Novo Ensino Médio":** conhecendo obstáculos e desafios no discurso dos professores de ciências. **Dissertação** (Mestrado) **–** Núcleo de Apoio ao Desenvolvimento Científico, Universidade Federal do Pará, 2004.

WANDERLEY, R. A. **Salinização de solos sob aplicação de rejeito de dessalinizadores com e sem adição de fertilizantes**. 52 f. (Dissertação de Mestrado) – Universidade de Federal Rural de Pernambuco, Recife. 2009.



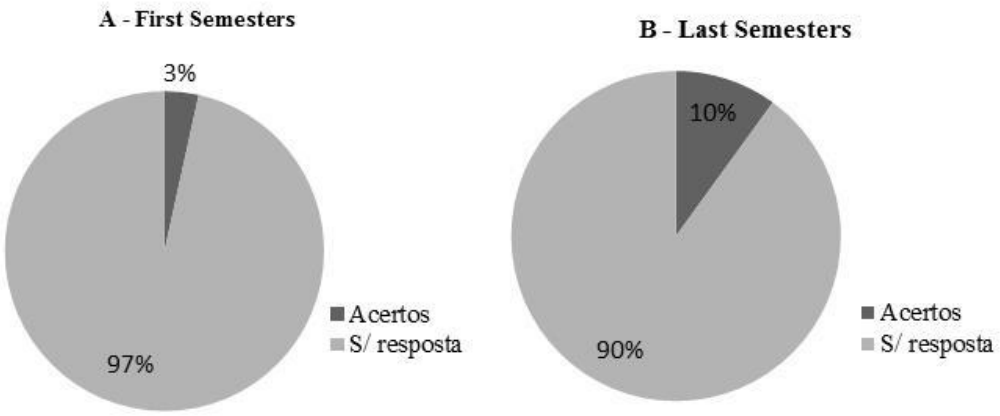
Source: done by the author

Figure 1. Average of correct answers of the students of the first (P.S.) and the last semesters (U.S.) of the Biological Sciences Course of the State University of Ceará, Brazil. The different letters differ statistically.



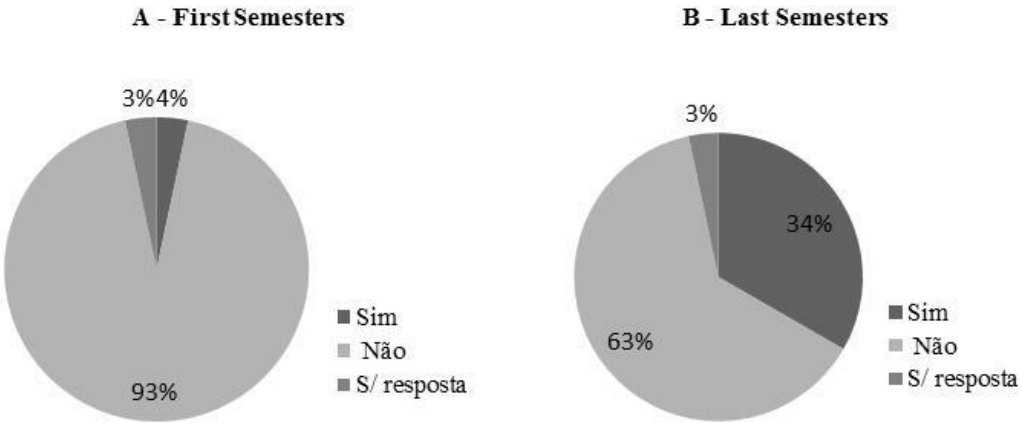
Source: done by the author

Figure 2. Percentage of the answers of the students of the first and last semesters of the Course of Biological Sciences of the State University of Ceará, Brazil, on the most present salts in the saline soil.



Source: done by the author

Figure 3. Percentage of the answers of the students of the first and last semesters of the Biological Sciences Course of the State University of Ceará, Brazil, on the difference of primary and secondary salinization.



Source: done by the author

Figure 4. Percentage of the answers of the students of the first and last semesters of the Biological Sciences Course of the State University of Ceará, Brazil, about the accomplishment of research in the environmental area.