Leadership among the Leaders of the Brazilian Research Groups in Marine Biotechnology

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Introduction

The Marine Biotechnology (MB) research area is gaining increasing relevance in Brazil. Its analysis is a challenge owing to the inherently multidisciplinary nature, and the study of research groups (RGs) may support this work. The task of analysing RGs is facilitated in Brazil, which has a national source gathering the country's RGs, maintained by the National Council for Scientific and Technological Development (*Conselho Nacional de Desenvolvimento Científico e Tecnológico* - CNPq): the Directory of Research Groups of the Lattes Platform (*Diretório dos Grupos de Pesquisa da Plataforma Lattes,* http://lattes.cnpq.br/web/dgp), with information from RGs related to: i. institutional headquarters; ii. Research Group name; iii. First leader name, iv. Second leader name (if any), and v. Predominant area. This source allows automatic data extraction already made available by research groups, allowing for full and systematic exploitation. This work aims to present first findings from exploitation on research groups in MB existing in Brazil registered in the Directory of RGs of the Lattes Platform, checking the collaboration networks formed by the leaders of these groups, mainly highlighting the natural influence that leaders have on other peers, meaning a leadership, focusing on research groups through the topological properties of networks with the use of Social Network Analysis (Abbasia, Wigand & Hossain, 2014), in order to behold their evolution and the role of the RGs' leaders in MB in Brazil and testing if it is possible to establish a relationship between the degree of leadership of the leaders considering topological information from networks.

Methods

This initial approach is focused on three points: 1. networks characterization in number of RGs involved, the active institutions and their location, and the dominant areas in multidisciplinary research; 2. description of the dynamic aspect of the network formed by these RGs through its evolution over the last 15 years, distributed in three five-year periods; and 3. determination of the "degree of leadership" of these networks' leaders, as measured by AuthorRank indicator, which is a numerical value that indicates the impact of a member in collaboration graph. This measurement is similar to PageRank for directed graphs (with weights) (Liu et al., 2005). Thus, the aim was to consider this indicator as an attribute of the leadership for the leaders of these RGs in the analyzed period.

Data collection and analysis

First, the MB research groups were identified by search using 37 MB terms raised in the related literature. Following, it was obtained data related to RGs such as institutions involved, 1st Leader name, and Main Area, allowing identify the Lattes ID (researcher identification number registered in the Lattes Platform) of the groups' leader. Second, we used scriptLattes tool (Mena-Chalco & Cesar Junior, 2009) in order to extract information associated with all the investigated leaders during the period of 15 years (1999-2013). We obtained data from the scientific production of each leader related to total articles, books, book chapters, and conference papers. For data analysis, we consider the professional addresses recorded for each leader to obtain the geographic location of each group through Google Maps tool. We obtained lists of full papers (solely) of the groups' leaders published in journals, and with scriptLattes tool we identify all publications in co-authorship. In addition, there were obtained the endogenous networks (internal collaboration) of the leaders. The AuthorRank was calculated for each actor. This indicator is commonly used for measuring the impact of members of an academic collaboration network (Liu et al., 2005). Our analysis was outlined considering four time periods: A global period (1999-2013) and three five-year periods: 1999-2003, 2004-2008, and 2009-2013. This division into different periods allows to study distinct topological characteristics of the network and its evolution.

Results

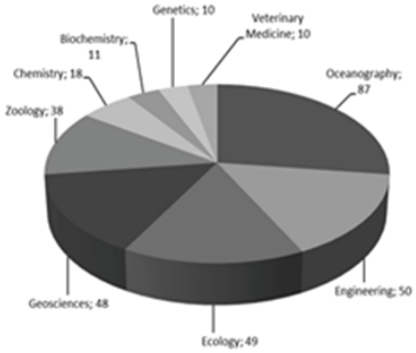

Figure 1. Main subject areas of the Brazilian research groups in Marine Biotechnology

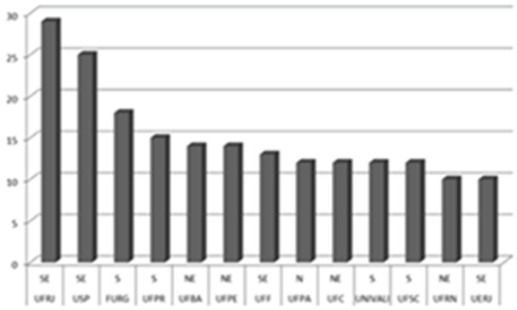

Figure 2. Brazilian institutions with over ten research groups in Marine Biotechnology

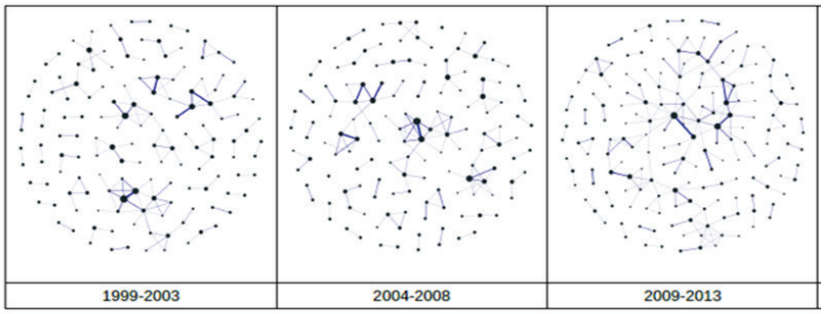

Figure 3. Co-authorship networks among leaders associated with the Brazilian research groups in Marine Biotechnology

Table 1. AuthorRank of the Leaders of the Brazilian research groups in Marine Biotechnology

Author Rank	Leader	Institution/Region
4.10	Teixeira, VL	UFF/SE
3.59	Colepicolo Neto, P	USP/SE
3.46	Rörig, LR	UFSCar/SE
3.33	Pereira, RC	UFF/SE
2.94	Pinto Jr, E	USP/SE
2.75	Mantelatto, FLM	USP/SE
2.67	Amado Filho, GM	JBRJ/SE
2.55	Sampaio, LAN	UFRN/NE
2.34	Bianchini, A	UFRN/NE
2.33	Berlinck, RGS	USP/SE

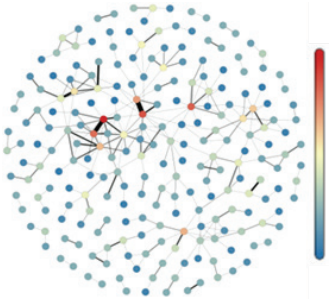

Figure 4. AuthorRank of the Leaders of the Brazilian research groups in Marine Biotechnology: co-authorship network

Discussion and conclusion

There are 402 RGs working in one or more topics related to the MB field from 34 different subject areas, main ones showed in Figure 1. RGs are from 110 institutions geographically concentrated along the Brazilian coast (South and southeast prevailing in number of institutions and research groups – Figure 2). We identified the leadership of the ten most active researchers in the co-authorship networks, with AuthorRank varying between 2.33 and 4.1 (Table 1). It was observed that there is a systematic increase in academic interactions during the considered period (Figure 3) and that academic leadership is not uniform among the leaders (Figure 4). The task of characterizing the emerging area of research in MB has grown in importance in Brazil, and this work relates to this issue.

References

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