

## ETHOLOGY & ANIMAL WELFARE RESEARCH IN BRAZIL

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**Abstract.** Mankind has always tried to understand the behavior of animals and also to establish close contact with wildlife aiming to domesticate, to utilize or to enjoy the company of other animals. Nowadays the study of animal behavior – ethology – is a science in this own right and animal welfare is seen as a growing area of interest among scientists of different backgrounds, bringing together ethology, veterinary, zoology, psychology, and husbandry under the same framework of common interests. Here, we surveyed PubMed database using two keywords, “ethology” and “animal welfare”, which encompassed the period from 1981 to 2017. Also we have consulted the Brazilian National Council for Scientific and Technological Development – i.e. “Diretório de Grupos do Conselho Nacional de Pesquisa (CNPq)” – aiming to disclose how many research groups there are working within the Animal Welfare realm, and where they are geographically localized. We found 156 articles addressing “Ethology” and “Animal Welfare”, an average of  $7.7 \pm 4.2$  articles per year from 2003 to 2017. 55 groups corresponding to 36.9% of the total are studying “Animal Welfare”. They are localized in 70% of the Brazilian states, mostly in the South and in the Northeast regions of the country. The presence of those groups allow us to be optimistic regarding the future of the Animal Welfare field in Brazil.

**Keywords:** Animal behavior studies, Applied Ethology research, Brazilian Animal-Welfare research groups.

**Resumo. A pesquisa em Etologia & Bem Estar Animal no Brasil.** A humanidade sempre procurou compreender o comportamento de outros animais, assim como estabelecer contato próximo com seres de vida silvestre, na tentativa de domesticá-los, utilizá-los de algum modo, ou simplesmente para usufruir da companhia deles. Atualmente o estudo do Comportamento Animal – i.e. Etologia – é uma ciência autônoma, e o Bem Estar Animal é visto como uma área de interesse de cientistas de diferentes formações acadêmicas, combinando etologia, veterinária, zoologia, psicologia e zootecnia em um mesmo quadro de interesses comuns. Neste trabalho nós consultamos o banco de dados da PubMed, usando as palavras chave “Ethology” e “Animal Welfare”. Esta consulta retornou trabalhos abrangendo o período de 1981 a 2017. Também consultamos o Diretório de Grupos do Conselho Nacional de Pesquisa (CNPq) do Brasil procurando identificar quantos grupos de pesquisa estão trabalhando na área de Bem Estar Animal, e onde estes grupos estão localizados geograficamente no país. Nossos resultados mostram a existência de 156 artigos sobre “Ethology” e “Animal Welfare”, uma média de  $7.7 \pm 4.2$  artigos por ano considerando o período de 2003 a 2017. O número de grupos de pesquisa estudando Bem Estar Animal no Brasil é 55, o que corresponde a 36.9% do total. 70% destes grupos estão localizados na região Sul e Nordeste do Brasil. Estes resultados, considerados em conjunto, permitem que tenhamos uma visão otimista sobre o futuro da área de Bem Estar Animal no Brasil.

**Palavras-chave:** Estudos em Comportamento Animal, Pesquisa em Etologia Aplicada, Grupos de Pesquisa em Bem Estar Animal no Brasil.

## INTRODUCTION

Ethology in Brazil started around 1960 as a scientific and academic endeavor at the Institute of Psychology, campus SP, University of São Paulo (FUCHS, 1995; ADES, 2010; OTTA *et al.*, 2013). Since its beginning the study of animal behavior has received contributions from many areas, as it progressed to incorporate a large diversity of approaches (MAGRINI *et al.*, 2016). Among them “Animal Welfare”, herein considered as a branch of the broad area “Applied Ethology” – which also includes “Conservation” – has always played a major role. The first meeting of ethologists in Brazil, happened in 1983. It was termed I *Encontro Paulista de Etologia* – i.e. São Paulo Ethology Meeting – heading by Prof. Dr. Mateus J. R. da Costa Paranhos (COSTA, 1992), a young researcher at that time, and nowadays an important and consolidated name in the Animal Welfare scenario.

Recently, a survey of doctoral dissertations and master theses of Ethology presented in Brazil during five years, from 2010 to 2014, showed how strong the field that embraces Animal Welfare is. Applied Ethology was the theme of 27% of master theses; and 44 theses (i.e. 8%) of a total of 531 were related to Animal Welfare *stricto sensu*. Applied Ethology was the topic of 20% of doctoral dissertations of a total of 295, and Animal Welfare was the main subject of 18, corresponding to 6% of total (SPINELLI DE OLIVEIRA & MAGRINI, 2015). These dissertations and theses were developed at different Graduate Programs all over Brazil, among a group of seven

more animal behavior subareas (see MAGRINI & SPINELLI DE OLIVEIRA, 2015).

Herein our contribution is to open a window at the international scenario of publications along the last decades regarding the binominal terms “ethology” and “animal welfare”, having PubMed database as a reference. Also, we intent to disclose how many research groups are in Brazil, working within the Animal Welfare realm, and where they are geographically localized, complementing a previous survey regarding animal behavior groups in Brazil (SPINELLI DE OLIVEIRA *et al.*, 2014).

Animal Welfare is a priority topic either when wild populations are concerned – especially when confined in parks, zoos or laboratory facilities – or when livestock and domestic animals are the main subject. Knowing who the expertise are, and where they are mean an important step to create ties and increase the influence of the field in the Brazilian and International scientific scenario. Animal Welfare has implications regarding ethics and animal rights at a time when former human attributes, such as “consciousness” are been extended to other animals (see THE CAMBRIDGE DECLARATION ON CONSCIOUSNESS, 2012).

## MATERIAL AND METHODS

### DEFINING WHAT WE MEAN BY “ANIMAL WELFARE”

“Animal Welfare” is considered here as a subarea of Applied Ethology (MAGRINI & SPINELLI DE OLIVEIRA, 2015; SPINELLI DE OLIVEIRA &

MAGRINI, 2015). Correlated areas such as “Applied Ethology” *stricto sensu* and “Conservation” were also accessed when counting the number of research groups working on these subjects, and these subareas sometimes are pooled for the sake of simplification.

### THE PUBMED DATABASE

According to the PubMed site <https://www.ncbi.nlm.nih.gov/pubmed/>, “PubMed comprises more than 28 million citations for biomedical literature from MEDLINE, life science journals, and online books”. Here we have surveyed PubMed database aiming to know how many publications can be found worldwide by using the combination of the two words – “Ethology” and “Animal Welfare”. A list corresponding to 24 years of publications, during an interval from 1981 to 2017, was returned. This dataset is presented in “Results and Discussion”.

### THE CNPQ DATABASE OF THE BRAZILIAN SOCIETY OF ETHOLOGY SITE

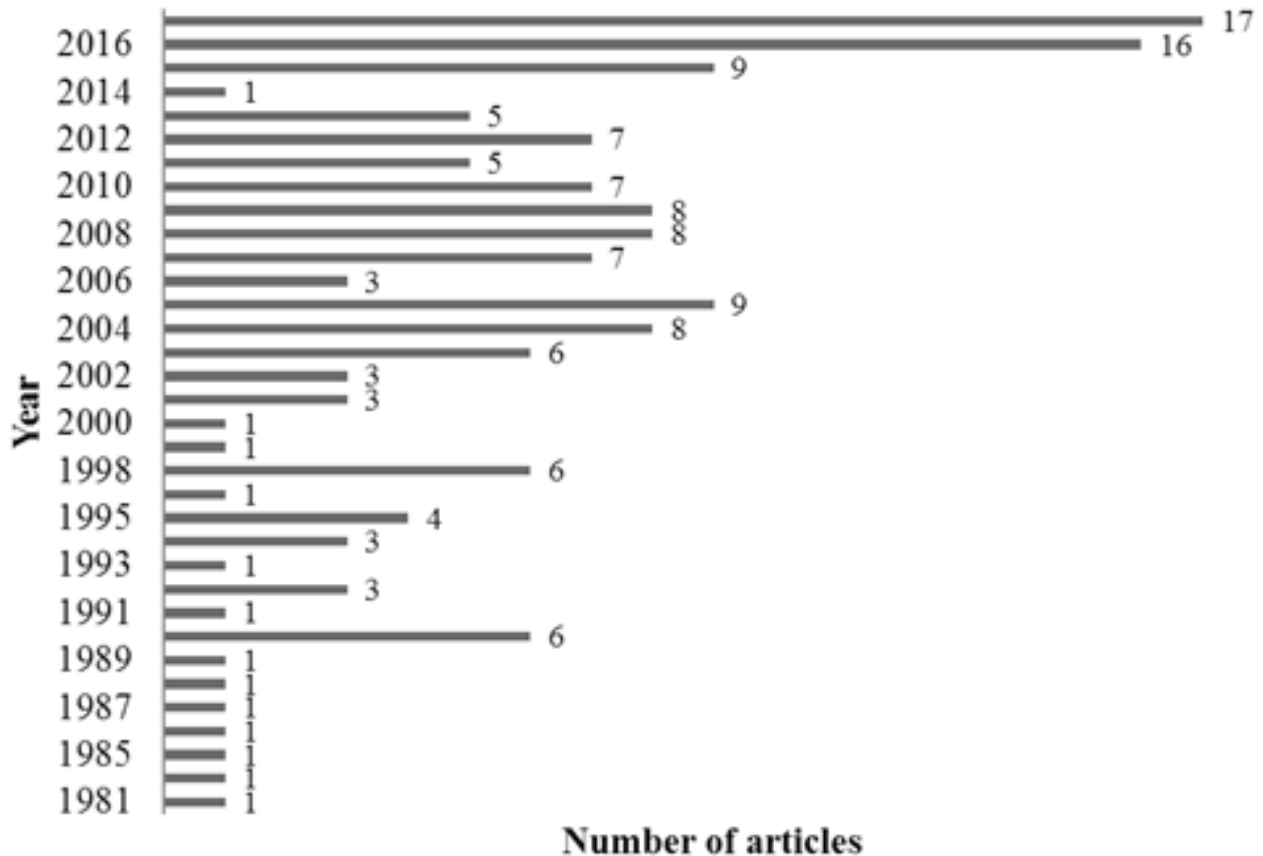
We also have verified how many research groups assume “Animal Welfare” as their main subject, using as source the dataset presented at the site of the Brazilian Society of Ethology – Sociedade Brasileira de Etologia (SBEt) – up to February, 2018. According to the SBET site the dataset was organized by the present Members of the Board (2016-2018) mainly consulting the Brazilian National Council for Scientific and Technological Development – “Diretório

de Grupos do Conselho Nacional de Pesquisa (CNPq)” – in Brazil. According to SBET, the consult was conducted using the key words Bioacoustics (“Bioacústica”), Animal Cognition (“Cognição Animal”), Animal Communication (“Comunicação Animal”), Behavior Evolution (“Evolução do Comportamento”), Comparative Psychology (“Psicologia Comparativa”), Behavioral Ecology (“Ecologia Comportamental”), Neuroethology (“Neuroetologia”), Applied Ethology (“Etologia Aplicada”) and Animal Welfare (“Bem Estar Animal”). Research groups were also invited by the SBET Board to complete the information whether for some reason their names were not included in the CNPq database.

## RESULTS AND DISCUSSION

### PUBMED DATABASE

156 articles are found at the PubMed database (Figure 1) when “Animal Welfare” and “Ethology” are combined as key words. From 1981 to 2002 the number of publications was  $2.1 \pm 1.7$ ; and from 2003 to 2017 this number increased more than three times to  $7.7 \pm 4.2$  worldwide (values shown as average  $\pm$  standard deviation). It is safe to say that the public interest has changed regarding animal welfare and animal rights, side to side to a new generation of concerned ethologists.



**Figure 1.** Number of articles overlapping the areas of “Ethology” and “Animal Welfare” published from 1981 to 2017 worldwide, according to PubMed database, US National Library of Medicine National Institutes of Health, February, 2018. An increase in the number of publications is observed around 2003, and is especially evident in 2016 and 2017.

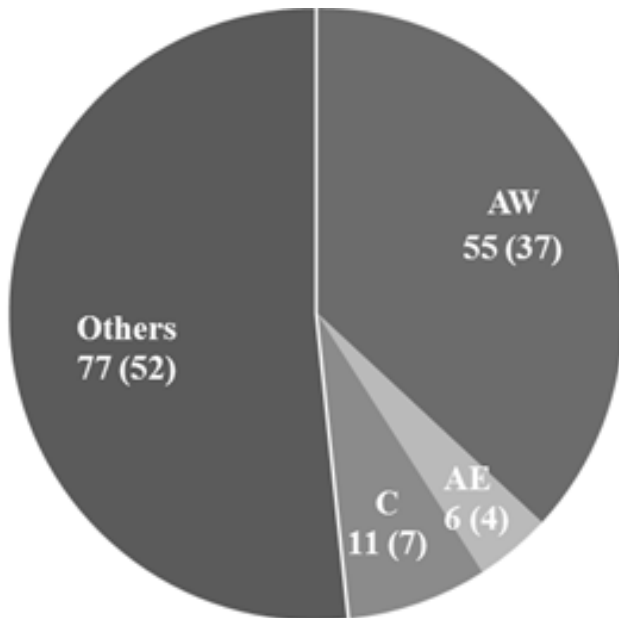
## CNPQ DATABASE AT THE BRAZILIAN SOCIETY OF ETHOLOGY SITE

### HOW MANY THERE ARE?

A total of 149 research groups are listed at the Brazilian Society of Ethology site: “Animal Welfare” corresponding to 55 groups (36.9% of the total), “Applied Ethology *stricto sensu*” to 6 groups (1.5%), “Conservation” to 11 groups (7.4%), and the remaining 77 research groups belong to the other subareas of Ethology corresponding to 51.7% of the total (Figure 2). Those numbers are even more expressive of the

importance of “Animal Welfare” in Brazil when we compare those values to the ones referring to dissertations and theses (MAGRINI & SPINELLI DE OLIVEIRA, 2015; SPINELLI DE OLIVEIRA & MAGRINI, 2015), that were more modest.

Brazil has such a large diversity of Biomes and native species, mostly hardly known, and it is also an important country when livestock is concerned (HOFF & SILVA, 2014), so this assess indicates a pathway for the expansion of knowledge of topics of general interest and of practical application in our country.

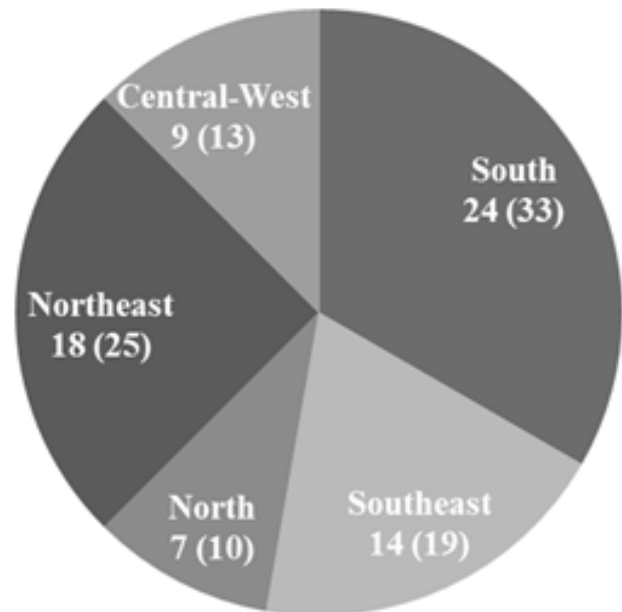


**Figure 2.** Research Groups studying Animal Welfare (AW), Applied Ethology (AE) *stricto sensu*, Conservation (C), and the “Others” subareas of Ethology (e.g. Behavioral Ecology and Communication). Number of Groups and percentage of the total (parenthesis) are provided.

Source: the Brazilian National Council for Scientific and Technological Development, “Diretório de Grupos do Conselho Nacional de Pesquisa (CNPq)”, in Brazil, February, 2018; and the Brazilian Society of Ethology, <http://www.etologiabrasil.org.br/etologia/>.

### WHERE THEY ARE?

Research groups studying Animal Welfare and correlated areas are present in the majority of the Brazilian Federative Units (18 states plus the Federal District, corresponding to 70% of total), and in all regions of Brazil (Figure 3). The largest number is found in the South region (n= 24 groups, corresponding to 33% of the total), followed by the Northeast region, with 18 groups, 25% of the total. The Southeast, the Central West, and the North regions, in a decreasing order, complete the scenario.



**Figure 3.** Research Groups of Animal Welfare, Applied Ethology *stricto sensu* and Conservation are pooled together and are distributed according to Brazilian regions. The South has the greatest number of groups, followed by the Northeast and Southeast regions. Number of Groups and percentage of the total (parenthesis) are provided.

Source: the Brazilian National Council for Scientific and Technological Development, “Diretório de Grupos do Conselho Nacional de Pesquisa (CNPq)”, in Brazil, February, 2018; and the Brazilian Society of Ethology, <http://www.etologiabrasil.org.br/etologia/>.

The Southeast region coming in third place is surprising. It is the most populated region of Brazil, it houses some of the most prestigious universities in the country, it concentrates most of the Brazilian Graduation Programs (DOS SANTOS & DE AZEVEDO, 2009), and it comprises the largest number of Brazilian researchers, i.e. 44% of total, according to the “Diretório de Grupos do Conselho Nacional de Pesquisa (CNPq)” in Brazil (see <http://lattes.cnpq.br/web/dgp/censo-atual/>).

When one considers the states where the research groups of “Animal Welfare” are localized a clearer picture emerges (Table 1). Pernambuco, São Paulo, Rio Grande do Sul and Paraná States have 50% of all research groups working with “Animal Welfare” in Brazil. Although it is not possible to establish a cause-effect relationship, it is worthwhile to consider the importance of those states when the presence of livestock is concerned, especially Paraná and Rio Grande do Sul States.

The three southern states of Brazil concentrated nearly 60 percent of hog production in Brazil (RUBIO *et al.*, 2017). According to BRAZILIAN INSTITUTE OF GEOGRAPHY AND STATISTIC (“INSTITUTO BRASILEIRO DE GEOGRAFIA E ESTATÍSTICA”), IBGE

(2016) Paraná stands out as being responsible for 17.2% of the national production. The Central-West region holds the first place when Brazilian bovine livestock is concerned (34.4% of total), but the South region produces 12.45 billion liters of milk per year or 37.0% of the national production (IBGE, 2016). Regarding ovine livestock, the Northeast region comes in the first place (63.0% of the national production), and the South region comes in second place holding 23.9% of the total, but 98.0% of all wool national production. Poultry is mainly a South (45.3% of total national production) and a Southeast business (37.8% of total). Paraná State alone produces 24.8% of the Brazilian poultry while the Southeast region produces 43.5% of the national output

**Table 1.** Number of research groups of Animal Welfare (n= 55, corresponding to 76.4%), and correlated areas, i.e. Applied Ethology *stricto sensu* (n= 6) and Conservation (n= 11), in accord with their distribution in Brazilian Federative units.

Source: Data according to the Brazilian National Council for Scientific and Technological Development, “Diretório de Grupos do Conselho Nacional de Pesquisa (CNPq)”, in February, 2018; and the Brazilian Society of Ethology, <http://www.etologiabrasil.org.br/etologia/>.

Federative units	Number of Groups
Paraná	10
Rio Grande do Sul	9
Pernambuco, São Paulo	8
Pará	6
Distrito Federal, Santa Catarina	5
Bahia, Rio de Janeiro	4
Mato Grosso do Sul, Minas Gerais, Paraíba	2
Alagoas, Amazonas, Ceará, Goiás, Mato Grosso, Piauí, Rio Grande do Norte	1
Total	72

of eggs and 66.9% of quails. Caprine is almost exclusively a business of the Northeast region, which is responsible for 93.0% of the national output. In addition, many laboratories working with Animal Welfare in the South region are located in Agricultural Sciences Departments and are involved in the welfare of poultry, porcine, bovine and ovine livestock.

Thus, we can go back to ODENDAAL (1994): “Renewed interest in veterinary ethology has been stimulated by increasing sensitivity in modern societies with regard to the use of animals, and a concurrent shift in emphasis in the veterinary profession, including veterinary education. Veterinary ethology appears to form the common ground where animal welfare activists and veterinarians can meet. Ethological parameters seem to be adequate when evaluating animal welfare and well-being, as well as for correcting situations of animal abuse. This approach in assessing animal welfare avoids either a mechanistic or an emotional evaluation of the quality of life of an animal”. A solid ethological background, and an extended view of “Veterinary Ethology” as defended by Odendaal to correlated subareas within Applied Ethology *lato sensu* should be highly desirable to the future of the research in Animal Welfare.

#### ACKNOWLEDGMENTS

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