

# Male homophily in South American herpetology: one of the major processes underlying the gender gap in publications

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**Abstract.** The growing number of gender studies encourages more refined analyzes and greater conceptualization of the underlying processes of gender gap in science. In Herpetology, previous studies have described gender disparities and a scrutiny of individual interactions may help revealing the mechanisms modelling the global pattern. In this contribution we modeled a co-authorship network, a previously unexplored methodology for gender studies in this discipline, in addition to a broad and classic bibliometric analysis of the discipline. Co-authorship networks were modelled for two South American journals, because this geo-political location is considered to present the best gender balance within general scientific communities. However, we found a pattern of male preferential connections (male homophily) that marginalizes women and maintains the gender gap, at both regional and global scales. This interpretation arises from results coming from multiple analyses, such as high homophily index in collaboration networks, lower female representation in articles than expected in a non-gender biased environment, the decrease of female co-authors when the article leader is a man, and the extreme masculinization of the editorial boards. The homophilic dynamics of the publication process reveals that academic activity is pervasive to unbalanced power relationships. Personal interactions shape the collective experience, tracing back to the Feminist Theory's axiom: "the personal is political".

**Keywords:** authors interactions, co-authorship networks, Editorial Board, female representation, gender disparity, herpetological journals, South America.

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## Introduction

Countless studies have documented a bias against women in science (e.g., Ceci and Williams, 2011; Handley et al., 2015; Wang and Degol, 2017; O'Brien et al., 2019; Huang et al., 2020). In 2019, UNESCO reported that women reached 29% of worldwide participation in science due to a gradual increase over the last decades, although heterogeneously through geographical locations and disciplines (Huang et al., 2020).

Argentina and Brazil stand out among the countries with the most significant progress narrowing the gender gap in recent years (Valentova et al., 2017; Elsevier Research Intelligence, 2020; Huang et al., 2020), and Life Sciences have reported a higher female participation in contrast to other scientific fields such as maths, physics, astronomy and computer science (Rossiter, 1997; Martin, 2012; McGuire et al., 2012; Bonham and Stefan, 2017; Wang and Degol, 2017; Holman et al., 2018; Salerno et al., 2019; Elsevier Research Intelligence, 2020).

Specifically in Herpetology there was a significant increase of female authors in the past decade, from 27.7% in 2010 to 34.5% in 2019 (Rock et al., 2021). Under this scenario, female herpetologists in Argentina and Brazil are supposedly subject to a double favourable condition. Nevertheless, recent analyses have shown that the increasing proportion of women in science has not led to a narrowing of the gender gap in terms of productivity, research impact, and career length (Wolfinger et al., 2009; Brooks et al., 2014; Cech and Blair-Loy, 2019; O'Brien et al., 2019; Huang et al., 2020; Rock et al., 2021).

The interactions between members of the scientific community is largely based on peer reciprocal recognition, which determines differential connections in a phenomenon called homophily (McPherson et al., 2001; Evans et al., 2011; Kegen, 2013; Fagan et al., 2018). This pattern of preferential relations is related to members' attributes, among which gender is one of the most evident (Fagan et al.,

2018). Academic articles are good indicators of research productivity and useful to discern the structure of the scientific community (Holman and Morandini, 2018; Holman et al., 2018). In this contribution we explore the publishing process, focusing on the author's interactions in Herpetology. Our main hypothesis is that in spite of a general increase in the number of women in this field, there is still a gender gap in authorship and a differential access to power positions in the publication process. We conducted a bibliometric analysis of the gender situation in the discipline and studied more closely the Argentinian and Brazilian communities, assuming they are nearly equitable in terms of gender.

## Materials and methods

We collected authorship information of articles of nine herpetological journals. Journals were selected to represent different editorials groups, geographic regions, scopes and quality categories defined by the SCImago rank (SCImago, 2020), plus a non-ranked journal (i.e., *Cuadernos de Herpetología*; table 1). We obtained the data from the title page available on the website of each journal. Our dataset contains authorship information from the first edition to 2019 for two journals (*Cuadernos de Herpetología* and the *South American Journal of Herpetology*) and from the 2018–2019 period for the remaining journals (see the following sections for more details). We also gathered information from editorial boards members of each journal in 2019.

The categorization as belonging to male or female was made using the first name as a proxy of gender by checking available databases (such as Gender Checker, 2020), and visual inspection of ResearchGate profiles (or similar). The individuals who could not be assigned as male or female were excluded from the analyses; however, it did not affect the overall sample size nor the relevance of the conclusions. We only portray summary statistics in this study, and the personal identity of all authors and editors included in the supporting information is masked to maintain their privacy. We are aware that the binary approach used herein for gender assignation excludes part of the community, because it might not reflect the author's self-perceived gender. We expect to overcome this limitation in future studies.

### *Co-authorship network analysis in South American journals*

Scientific communities can be modeled as networks which intrinsically are collections of entities connected through relationships (Newman, 2004). A co-authorship network is

**Table 1.** Herpetological journals sampled in this study.

Journal	Quartile	ISSN	Publisher	Country
<i>Herpetologica</i>	1	180831	Herpetologists' League Allen press	USA
<i>Herpetological Monographs</i>	1	7331347	Herpetologists' League Allen press	USA
<i>Acta Herpetologica</i>	2	18279635 18279643	Societas Herpetologica Italica	Italy
<i>South American Journal of Herpetology</i>	2	1982355X 18089798	Brazilian Society of Herpetology	Brazil
<i>Phyllomedusa</i>	3	15191397	Universidad de São Paulo	Brazil
<i>African Journal of Herpetology</i>	3	21564574 21533660	Herpetological Association of Africa	UK
<i>Herpetological Bulletin</i>	4	14730928	The British Herpetological Society	UK
<i>Herpetological Review</i>	4	0018084X	Society for the Study of Amphibians and Reptiles	USA
<i>Cuadernos de Herpetología</i>	–	0326-551X 1852-5768	Asociación Civil Herpetológica Argentina	Argentina

depicted by researchers connected to each other through co-authored papers (Huang et al., 2008). This operative strategy represents a methodological tool to measure aspects of complex dynamics of scientific collaboration to understand this social phenomenon (Falk-Krzesinski et al., 2011; Fagan et al., 2018).

We modeled co-authorship networks for the two journals of the oldest herpetological association in South America: *Cuadernos de Herpetología* (published by the Herpetological Argentine Association) and the *South American Journal of Herpetology* (published by the Brazilian Society of Herpetology). An adjacency matrix was calculated based on all the articles published since the first edition of each journal until 2019. The adjacency matrix defines the connectivity pattern of the community by indicating whether pairs of authors (i.e., pair of nodes) are connected by co-authorship in one or more papers. We have explicitly identified the gender of each node in the network. Based on the adjacency matrix, a non-directed and non-weighted network was constructed (for a background in network theoretic concepts, see Newman, 2001, 2004; Rasskin-Gutman and Esteve-Altava, 2014; Fagan et al., 2018, and references therein). A series of network and node parameters were calculated based on the giant component of the network, a large group of individuals who are all connected to one another by intermediate paths (Newman, 2001; see results). The giant component of the network was characterized by calculating the following parameters: (a) ratio of the number of female nodes to the total; (b) differential connections between nodes (male to male, female to female, or mixed gender); (c) network density (the number of existing connections to the maximum possible); (d) homophily coefficient (the extent to which connected nodes belong to the same gender; Newman, 2002, 2003).

Nodes were characterized by parameters of centrality and connectivity. Centrality measures capture how connected an individual node is to the network and it is often interpreted as a proxy of leadership degree in a community (Dos Santos et al., 2017). The centrality parameters assessed

were: (1) degree: the number of links of a node (Csardi and Nepusz, 2006); (2) betweenness: the frequency of events in which a node is located in the shortest path between a pair of nodes (Dos Santos et al., 2017); (3) closeness: the average length of the shortest path between that particular node and all other nodes in the network (Freeman, 1979); (4) eigen-centrality: the first eigenvector of the adjacency matrix of the graph (Bonacich, 1987). Nodes with high eigen-centralities are those connected to many other nodes, which are, in turn, connected to many others (and so on). Central nodes, under this criterion, belong to centers of big cohesive sets of nodes (Csardi and Nepusz, 2006). Additionally, we have measured: (1) local transitivity: the probability that the adjacent vertices of nodes are connected (Barrat et al., 2004); (2) shortest path length: the average of the minimum distances between each pair of nodes in the network (distance is measured as the number of connections and all connections have equal length); (3) intramodular connectivity: connectivity from a given node to other nodes in its module/community; (4) participation index: uniformity in the distribution of connections to nodes that belong to other modules (Rasskin-Gutman and Esteve-Altava, 2014).

We compared node parameters within the giant component of the network between female and male nodes. The significance of the differences was calculated with Kruskal-Wallis tests, and a post-hoc Wilcoxon pairwise comparison test was performed. The analyses were performed using igraph 1.2.5 (Csardi and Nepusz, 2006) and brainGraph 2.7.3 (Watson, 2019).

#### *Bibliometric analysis in scientific journals*

We used descriptive statistics for a general exploration of the distribution of genders in the authorship of the articles. We used Generalized Linear Models (GLMs) with quasi-binomial error to explore if differences in female participation are related to the following variables: (1) taxonomic group under study (amphibians, reptiles, or both); (2) sub-discipline of study (natural history short communications,

biogeography, conservation, ecology, ethology, genetics, methodology, morphology, and systematics); (3) publishing group (multiple-authored with mixed and same-gender groups, and single author); (4) journal quartiles (Q1-Q4 and non-ranked); and (5) authorship position (gender of the first and last author). As journals varied in the number of volumes and articles annually printed, we reduced uneven representation for each variable by randomizing and resampling articles based on the lowest category representation.

To estimate the probability of finding the resulting number of multi-authored papers with at least one woman participating, we performed 100 000 simulations with the observed paper frequencies assigning the authors gender at random using the observed proportion of women in the full author pool.

#### *Editorial Board patterns*

We collected gender data for the chief and senior editors and editorial boards of each journal in 2019, except for *Herpetological Bulletin*, for which no information was available. We analyzed the gender composition of the editorial boards by journals and journal category. Also, we used the Jaccard index to estimate if chief editors and members of editorial boards are shared between different journals (i.e., if a same person occupies positions in two or more journals).

Co-authorship networks, bibliometric analysis, and editorial board patterns were performed in R version 3.6.3 (R Core Team, 2020); estimations on female real versus potential participation were performed in Python (<https://www.python.org/>); figures were created using Inkscape (<https://inkscape.org/>). Raw data is shared as supplemental files and codes are uploaded to GitHub repository ([https://github.com/jessicafratani/Grosso\\_et.al.git](https://github.com/jessicafratani/Grosso_et.al.git)).

## **Results**

### *Co-authorship network analysis in South American journals*

For the 461 papers published in *Cuadernos de Herpetología*, the number of female authors was slightly lower than male authors (46.8%). The giant component of the network included 376 of the 595 authors (enlightened area in fig. 1A), almost half of the connections were between authors of different gender (48.9%; fig. 1A-B), and there was no preferential connection between male or female authors (homophily coefficient = 0.012). Each author was connected with about 10 other authors, without gender differences in degree. Male authors showed significantly higher betweenness, but there were no significant differences between

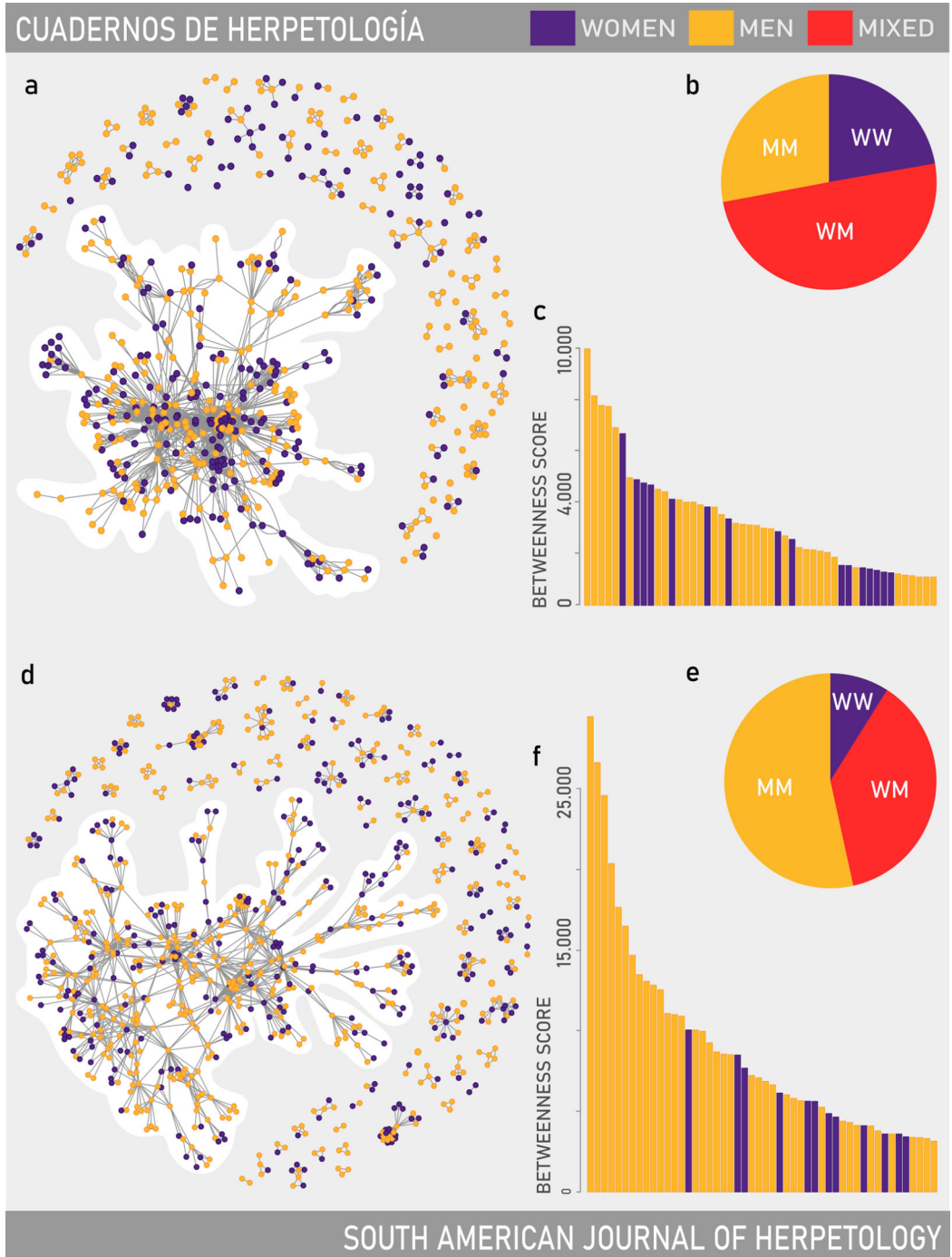
genders in other centrality indicators. There were 16 women among the top 40 betweenness values, and the 6th place was the best-scored position reached by a woman (fig. 1C, table 2, supplementary tables S1-S2).

In the 363 papers published in the *South American Journal of Herpetology*, the number of female authors was lower than male authors (36.2%). The giant component includes 478 of the 868 authors (enlightened area in fig. 1D), 53% of the connections were exclusively between men (homophily coefficient = 0.065; fig. 1D-E). Male authors were more connected than female authors, with significantly higher centrality values. There were 12 women among the top 40 betweenness values, and the 15th place was the best-scored position reached by a woman (fig. 1F, table 2, supplementary tables S1-S2).

In both journals, female authors presented a significantly high probability of publishing in tightly connected communities (i.e., local transitivity; table 2). Also, male and female authors did not differ in other connectivity parameters such as shortest path length, intramodular connectivity, or participation index.

### *Bibliometric analysis in scientific journals*

Female researchers represented 30.3% of the total authors (fig. 2A, table 3). In 39.1% of the 463 analyzed articles no women participated. There were no significant differences in female participation between articles of different taxonomic groups (amphibians and reptiles; estimate = -0.27; SE = 0.16;  $t = -1.72$ ;  $P = 0.08$ ; fig. 2B), but differences were observed among the sub-areas of study (fig. 2C). Gender distribution was almost even in conservation articles; on the contrary, most of natural history short communications were authored by a single male author (57%). Ecology and ethology articles had a significantly higher proportion of female authorship (36.0% and 34.6%, respectively) than biogeography, morphology, and systematics papers, which presented the



**Figure 1.** Co-authorship networks of two South American herpetological journals, considering multiple-authored articles published. Each point represents an author colored by gender, and each line represents a co-authorship connection in a publication. The enlightened areas are the most connected clusters in each network. Pie-charts show the distribution of connections by gender. Barplots show the gender distribution of the first 40 higher betweenness scores. (A-C) *Cuadernos de Herpetología*'s network of papers published between 1985 and 2019. (D-F) *South American Journal of Herpetology*'s network of papers published between 2006 and 2019. Abbreviations: MM = man–man connections; WM = woman–man connections; WW = woman–woman connections.

**Table 2.** Summary of Kruskal-Wallis tests of node parameters mean by gender comparisons in networks of Cuadernos de Herpetología (CHER) and South American Journal of Herpetology (SAJH).

Node parameters	CHER		SAJH	
	Mean values by gender	P-values	Mean values by gender	P-values
Degree	W: 10.69 M: 10.16	0.67	W: 4.772 M: 7.238	<0.01**
Betweenness	W: 345.411 M: 713.713	<0.01**	W: 442.0799 M: 1361.324	<0.01**
Closeness	W: 0.0007217 M: 0.0007128	0.76	W: 0.000391 M: 0.000418	<0.01**
Eigen-centrality	W: 0.1147 M: 0.1057	0.50	W: 0.0210 M: 0.0519	<0.01**
Local Transitivity	W: 0.7492 M: 0.6153	<0.01**	W: 0.8457 M: 0.7450	<0.01**
Shortest path length	W: 3.8435 M: 3.9058	0.76	W: 5.326 M: 5.249	0.56
Intramodular connectivity	W: 0.0158 M: -0.0139	0.52	W: 0.0112 M: -0.0065	0.87
Participation index	W: 0.3085 M: 0.3188	0.82	W: 0.0946 M: 0.1213	0.08

Abbreviations: W = women; M = men.

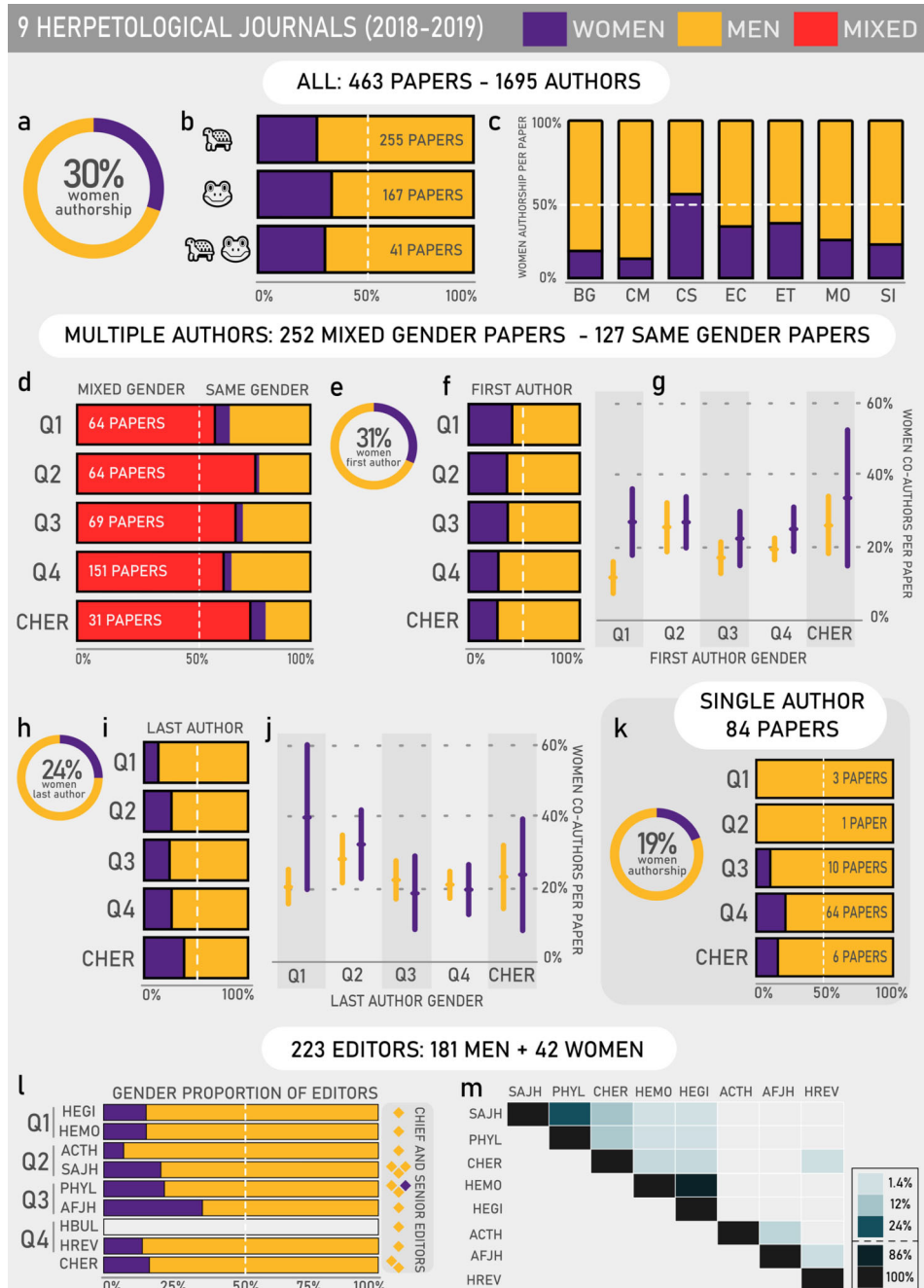
**Table 3.** Summary of papers published in nine herpetological journals during 2018 and 2019.

Journal rank	Multiple authorship			Individual authorship		Total
	Mixed gender	Same gender		Men	Women	
		Men	Women			
Q1	38	22	4	3	0	67
Q2	49	14	1	1	0	65
Q3	47	20	2	9	1	79
Q4	95	51	5	50	14	215
CHER	23	6	2	5	1	37
Total	252	113	14	68	16	463

lowest female participation (see also supplementary table S3).

Among multi-authored articles (82% of the total), there was at least one male author in 96% of them. When at least one woman participated in an article, the average of male co-authors was 2.8; in contrast, there were on average 1.26 female co-authors in articles with at least one man. The probability that at least one woman participates in the same or lesser number of papers than the observed, using random gender assignment and the observed female proportion (0.31) was 0.07 (supplementary fig. S1). Same-gender papers represented 34% of the multi-authored articles, women-exclusive publications were a small volume (about 4% of

the total of multi-authored papers) without distinction on journal quartile (fig. 2D). Women performed as first authors in 31.4% of multi-authored publications, with an increase in top-quartile journals (ranging between 26% in Q4 journals and *Cuadernos de Herpetología* to 36% in Q1-Q3 journals; fig. 2E-F). The gender of the first author had a significant effect on the proportion of female co-authors (estimate = 0.35; SE = 0.13;  $t = 2.63$ ;  $P < 0.01$ ; fig. 2G). Female co-authorship was 25.8% when the first author was a woman and dropped to 19.6% when the first author was a man. This trend remained the same within each quartile, however, only in Q1 journals this difference was significant (estimate = 1.3; SE = 0.4;  $t =$



**Figure 2.** Bibliometric data of nine herpetological journals. (A-C) Gender ratio in papers published during 2018 and 2019, considering different taxonomic groups and sub-areas. Multi authored papers considering the journal’s qualities: (D) gender composition within publishing groups, and (E-J) gender participation in protagonic roles and its effect on the proportion of female co-authors. Single authored papers: (K) gender distribution on average and discriminated by journal’s qualities. Editorial Boards by journals in 2019: (L) gender proportion within each journal, and (M) percentage of similarity between members of different journals. Abbreviations: ACTH = *Acta Herpetologica*; AFJH = *African Journal of Herpetology*; BG = *Biogeography*; CHER = *Cuadernos de Herpetología*; CM = *Communication*; CS = *Conservation*; EC = *Ecology*; ET = *Ethology*; HBUL = *Herpetological Bulletin*; HEGI = *Herpetologica*; HEMO = *Herpetological Monographs*; HREV = *Herpetological Review*; MO = *Morphology*; PHYL = *Phyllomedusa*; SAJH = *South American Journal of Herpetology*; SI = *Systematics*; Q1 = 1st quartile; Q2 = 2nd quartile; Q3 = 3rd quartile; Q4 = 4th quartile.

3.231;  $P < 0.001$ ). Women were last-authors in 24.4% of total multi-authored articles, with a higher percentage in bottom-quartile journals (33% in Q4 and CH and 22% in Q1-Q3 journals; fig. 2H-I). The last author's gender had no statistically significant effect on female co-authorship among journals nor quality categories (this may be related to the low number of female last authors in the sample); however, a trend to a higher female participation per paper was observed when the last author was a woman in Q1 and Q2 journals (fig. 2J).

Among the single-authored articles, most of them were published in bottom-quartiles journals, and 19% of them were written by a woman (16 papers; fig. 2K). Men published alone 81% of the time (68 papers), principally in natural history, short communications, and ecology and biogeography articles.

#### *Chair and Editorial Board patterns*

In 2019, the editor-in-chief and senior editors of the nine journals analyzed (fig. 2L, table 1) were men except for one woman who performed as senior editor in *Phyllomedusa* journal. Editorial boards were composed of 223 editors, with a female representation of 23% (ranging from 7% to 36% in different journals). The editorial boards of *Phyllomedusa* and *South American Journal of Herpetology* (both Brazilian journals) shared 24% of their members, while the editorial board of *Herpetological Monographs* and *Herpetologica* (both Q1 journals) presented 86% of their members in common (fig. 2M).

## **Discussion**

There is a documented tendency to publish with authors of the same gender across Life Sciences (Holman and Morandin, 2018; Elsevier Research Intelligence, 2020). Even under the relative favourable condition in Argentinian and Brazilian Herpetology our results showed that gender homophily is one of the main mechanisms modulating the interaction structure in

Herpetology. Positive men's homophily was detected in the *South American Journal of Herpetology* network model and male homophily was also detected in international publications and in journal editorial boards.

In the networks of *South American Journal of Herpetology* and *Cuadernos de Herpetología* there is a tendency of both male and female authors to establish connection routes that pass through a male node (i.e., men's nodes tend to have higher betweenness scores). While *Cuadernos de Herpetología* presents a trend to gender equality, the *South American Journal of Herpetology* showed a deeper gender asymmetry with significant higher values for male network homophily and all centrality parameters. The two journals have a similar scope but differ on their quartiles: *Cuadernos de Herpetología* is an unranked journal while *South American Journal of Herpetology* is ranked as quartile 2 (SCImago, 2020). The impact factor of a journal is not a measure of the quality of individual scientists' research articles (Cislak et al., 2018), but it represents the prestige of the journal and implies a broader public outreach (Pernerger, 2010). Our results indicate a rising male homophily among coauthors of the better categorized journal, hindering the possibility of a woman to access environments perceived as prestigious.

Among herpetologists publishing in the South American journals, the probability that two authors with a common collaborator write a paper together is above 60%, increasing over 70% if the common collaborator is a woman. This suggests that the Herpetological community in South America established highly cohesive publishing groups, which explains the more local and restricted range of influence of female researchers against a more widespread influence of men. Previous studies claim that gender difference in interpersonal interaction strategies is caused by different styles of social network construction, in which girls tend to evolve in small homogeneous groups (Shrum et al., 1998; Helmer et al., 2017). Explaining the relative



insularization of women might not be straightforward. We hypothesize that at least three causes (with possible interactions among them) may lead to this result: women prefer to work within the same group and do not expand their connections, women are not invited to collaborate with members outside their work groups, and women face difficulties to collaborate outside their main work group when they intend to do so.

Women are more represented in South American (36% and 47% of the total number of authors in SAJH and CHER, respectively) than in international journals (30%). During 2018 and 2019 women were absent in 39% of the international articles, while at least one man was present in almost all multi-authored articles (94%) and published alone four times more often than women. A similar trend based on a more comprehensive dataset of herpetological articles showed a general predominance of male authors and a higher number of single authored papers published by men (Rock et al., 2021). Although these numbers show a male dominated scenario, we wondered if the low participation of women in publishing groups is related to a small number of female authors as a baseline population or if there are other underlying processes. We found that with random gender assignment, the probability of having the observed participation of women or less is 0.07. In other words, in 93% of the cases the simulation resulted in a better scenario for women than portrayed by the real data. The depicted gender bias can be explained by a male to male preference for publishing, a pattern that has recurrently emerged in our analyses.

A recent analysis found that women are less represented in studies involving herpetological taxa perceived as dangerous such as Crocodylia (Rock et al., 2021). We were not able to find a differential pattern of female participation between articles of different taxonomic groups, maybe because we used categories with lower taxonomic resolution (i.e., amphibia, reptilia). We did find that female authors surpassed the

overall average of participation in articles concerning ecology, ethology and conservation, but are underrepresented in articles of subdisciplines such as morphology, systematics, biogeography and natural history short communications. Although we were not able to identify if this trend is related to differences in social interactions, to historical background, or to the nature of the work such as type of field work; further analyses could clarify it.

Previous reports for Herpetology and other scientific areas found that women are overrepresented as first author and underrepresented as last author (Martin, 2012; West et al., 2013; Fox et al., 2018; Salerno et al., 2019; Rock et al., 2021). Our analyses showed that leading roles (first and last authors) in herpetological publications are occupied by a woman about one fourth of the time. Journals with higher quartiles have on average the highest female participation as first authors and the lowest female participation as last authors. There is a shift of this tendency in the lower quartile journals, with a higher proportion of female last authors. These numbers seem to depict an active recruitment of women during their early stages of their careers publishing in high impact journals, but a probable shorter permanence in activity than their male counterparts. Consequently, there are less women in leadership positions within research groups as well as available for mentoring. In a more optimistic scenario, the gradual increase of women participation over the last years will fill that gap in the near future. Further analyses in the next decade may give us a better diagnosis of the situation.

Women in leadership positions pull up other female researchers and generate a positive effect on gender balance, as was also described for other disciplines and fields of biology (Sardelis and Drew, 2016; Bonham and Stefan, 2017; Potvin et al., 2018; Salerno et al., 2019; Rock et al., 2021). We found that when a woman occupies one of the central roles in herpetological articles (i.e., first or last author), the

number of female co-authors increases. However, these women in leadership positions are few and scattered in a male homophilic system. Previous researches demonstrated that when the influence of these driver women is reduced, the systems quickly returns to their previous gender-biased state (Helmer et al., 2017; Maas et al., 2020). It should also be noted that in this male dominated context, publications with female majority could end up being passed over or less cited due to unconscious negative bias (Larivière et al., 2013; Helmer et al., 2017).

Journal's editorial boards play a crucial role in science, supervising the quality and type of publications and influencing the course of research (Zsindely et al., 1982; Mauleón et al., 2013; Cho et al., 2014). Members of editorial boards are commonly peer-selected, according to their experience and prestige (Crane, 1967; Merton et al., 1977; Pearson et al., 2006). Editorial boards of herpetological journals are strongly masculinized and present some overlap of their members among journals (fig. 2L-M). The alarming low number of women in editorial boards concerns not only herpetological journals but also a wide range of STEM journals (Cho et al., 2014; Fox et al., 2016; Salerno et al., 2019; Liévano-Latorre et al., 2020). These numbers misrepresent the gender diversity of the scientific community and it might negatively influence the manuscript evaluation process and women's participation in published research (Metz and Harzing, 2009; Mauleón et al., 2013; Cho et al., 2014). Previous studies showed that editors of both genders have a homophilic tendency to appoint reviewers, reinforcing the inbreeding homophily of the peer-review system (Helmer et al., 2017). Although most herpetological journals analyzed in this paper promote gender equity in authorship, we found no formal regulation of this aspect on editorial boards. Balancing the representativity of women in editorial boards should be included in editorial policies (Cho et al., 2014). In line with this, after the approval of the Gender Equity Protocol of the AHA in 2019, six new women

editors have been incorporated into its journal (*Cuadernos de Herpetología*). This rising female proportion—from 14% to 35%—evidences the relevance of policy making to cope with gender inequality.

In summary, we revealed three main aspects of the gender situation in herpetology. Firstly, female participation in South America is greater than in general scientific communities. This result is similar to previous findings for the broad scientific community (Elsevier Research Intelligence, 2020). Further studies that include the social and economic situation of the countries in the last decades are needed to comprehend this pattern. Secondly, we identified a large percentage of women publishing in high impact journals during their early career stages, but their participation declines as last author, probably reflecting a shorter permanence in activity. This result is in agreement with previous analyses including different scientific disciplines (e.g., Huang et al., 2020), and represents a useful diagnosis to design institutional policies to promote the permanency of women in Herpetology. Lastly, we found that male homophily is contributing to a strong inertial pattern of a community historically rooted in a male dominated environment (Rock et al., 2021). One shocking example is the composition of the editorial boards, even more worrying because of the key position they hold in the publishing process. As noticed, reversing this pattern of gender inequality is not ensured by merely increasing the total number of women in scientific fields, but it may be addressed by designing policies that consider the historical and inherited processes operating under gender imbalance and identifying the groups in which these policies need to be focused.

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