

The Ecological Price of Segregation: Socioeconomic Stratification Structures Urban Bird and Vegetation Distribution

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Abstract

As income inequality rises, cities do not merely become less equal in aggregate; they also sort residents into increasingly separate neighborhoods, a spatial process known as socioeconomic segregation. Building on a companion study that documented the luxury effect in Bogotá using cadastral land value (Mutis & Armenteras, 2026), this analysis asks a distinct question: does the city's institutionalized stratification system—the official six-tier "estratos" that determine utility subsidies, social stigma, and municipal investment—have an ecological signature of its own? We analyzed 118,447 eBird records (2010–2024) covering 258 species, spatially joined to cadastral strata. The three highest strata (4–6), occupying only 26.4% of the city's urban area, accounted for 52.3% of all bird occurrences, while the three lowest strata (1–3), covering 73.6% of the area, accounted for 47.7%. Species-level analyses revealed heterogeneity: habitat generalists occurred across all strata, wetland species clustered in strata 3–4, and forest specialists concentrated in stratum 6, coinciding with the Eastern Hills. A complementary analysis of the Normalized Difference Vegetation Index (NDVI) across 5,315 urban parks showed vegetation cover rising steadily from lower to higher strata (Tukey post-hoc, $p < 0.05$), positively correlating with bird richness ($\beta = 72.7$, $p < 0.001$). Together with the companion land-value analysis, these results suggest that in Bogotá the boundaries separating human social worlds also partition its avian communities and the vegetation that sustains them, with direct implications for equitable green-infrastructure planning in highly segregated cities of the Global South.

Keywords: socioeconomic segregation; luxury effect; urban ecology; avian diversity; NDVI; vegetation index; environmental justice; Bogotá; citizen science; eBird

1. Introduction

Residential segregation known as the degree to which different social groups live apart from one another within a city, is one of the most consistently documented features of urban inequality (Massey & Denton, 1988). Its relationship to income inequality is complex and shaped by local political, economic, and urban-planning contexts (Tammaru et al., 2020), but a growing body of evidence points to a causal link between the two, even though the effects are not immediate: rises in income inequality are typically followed, after a time lag, by corresponding increases in segregation, underscoring the gradual dynamics through which economic inequality is eventually translated into spatial divisions within urban areas (van Ham et al., 2021). This lag reflects a stepwise process in which some neighborhoods deteriorate while others improve, triggering selective residential mobility as households relocate according to socioeconomic status; over time, this mobility reshapes the map of the city itself. Put simply, segregation is the spatial form that inequality eventually takes (van Ham et al., 2021).

If segregation is inequality made spatial, it is reasonable to ask whether it is also inequality made ecological. The clearest evidence for this comes from the so-called 'luxury effect': the tendency for wealthier urban neighborhoods to support greater biodiversity than poorer ones (Hope et al., 2003). Since it was first described for urban plant diversity in Phoenix, Arizona, the pattern has been documented across a wide range of taxa and cities, including birds, and is now considered one of the more consistent findings in urban ecology (Leong et al., 2018). Where it holds, the luxury effect implies that the benefits associated with urban biodiversity (recreational, aesthetic, and psychological) are distributed unequally, tracking the very same neighborhood boundaries that segregation produces (Leong et al., 2018). This is not only a matter of income. In South Africa, for instance, where urban segregation was for decades a matter of explicit state policy, green infrastructure remains sharply divided along the same income and racial lines that Apartheid-era planning imposed, illustrating how directly segregation and access to urban nature can be linked (Venter et al., 2020). At the same time, the luxury effect is not universal: tests conducted outside the wealthy cities of the Global North, where most of the founding literature

originates, have found that its strength, and even its direction, can vary with the level of urbanization and the aridity of the study area (Chamberlain et al., 2019).

Latin American cities, in particular, combine high levels of biodiversity with some of the most extreme income inequality and residential segregation in the world, yet remain comparatively understudied in this literature (Kuras et al., 2020). Bogotá, Colombia, illustrates this combination unusually well. The city hosts over 200 recorded bird species (Castro-Vargas et al., 2020) and sits within one of the most biodiverse regions on the planet, while also enforcing a formal socioeconomic stratified classification system (the “*estratificación socioeconómica*” or “*estratos*”) that assigns every urban block to one of six strata, from 1 (lowest) to 6 (highest), hereafter referred to as strata, stratum. Originally designed to allow differentiated utility pricing, this stratification system has been shown to function, in practice, as a powerful generator of residential segregation, sorting the city’s population into strata that operate as largely separate social and spatial worlds and that carry a widely recognized, unofficial status of their own (Gutiérrez López et al., 2021; Bogliacino et al., 2018). Few cities offer as explicit, and as spatially precise, an official map of segregation as Bogotá’s strata, which makes the city an unusually well-suited setting for testing whether that segregation extends into the distribution of urban wildlife.

Beyond overall abundance, individual bird species are expected to respond differently to this segregated landscape depending on their ecological requirements. While our companion study (Mutis & Armenteras, 2026) demonstrated that economic inequality (measured via land value) correlates with bird richness, it left a critical question unanswered: does institutionalized spatial segregation (the official categorization of neighborhoods into separate social worlds) have an independent ecological signature? In Bogotá, the strata system is not merely a proxy for income; it is a bureaucratic label that determines utility subsidies, influences social stigma, and dictates municipal investment in public space (Gutiérrez López et al., 2021). Unlike the continuous gradient of land value, the stratification system creates discrete, sharply bounded social territories. Here, we test whether these socio-spatial boundaries, the very lines that divide the city’s population, also divide its avian communities. This moves the luxury effect beyond wealth and into the realm of spatial justice and state-sponsored segregation.

Building on this conceptual shift, this study examines whether, and how, bird occurrences recorded through citizen science are distributed across Bogotá's socioeconomically segregated strata. Specifically, it (1) quantifies the overall association between stratum and the spatial density of bird occurrences; (2) compares frequency distributions across strata for species with contrasting ecological requirements, from habitat generalists to forest and wetland specialists; (3) uses ordered logistic regression, fitted separately for each species with stratum as the ordinal response, to characterize how each species' occurrence records are distributed across the six strata; and (4) performs an analysis of the NDVI across urban parks to test whether vegetation cover follows the same socioeconomic gradient, correlates with bird species richness, and exhibits inequality in its distribution across strata.

This analysis complements a parallel, spatially explicit study of the same broader eBird dataset, which models bird occurrence as a function of cadastral land value (Mutis & Armenteras, 2026). Here, the focus is instead on the coarser but socially meaningful six-tier stratification that structures everyday life (and, often, day-to-day environmental experience) in Bogotá, treating that stratification explicitly as a map of segregation rather than simply as a proxy for income. Using this categorical approach, we aim to capture non-linear ecological thresholds that continuous wealth variables might overlook.

2. Methods

2.1 Study area and data sources

Bogotá, D.C., the capital and largest urban center of Colombia, is situated at an elevation of 2,640 meters on the eastern plateau of the Andean Cordillera Oriental (Figure 1). The city covers a complex urban matrix characterized by a high population density, exceeding 7.4 million inhabitants and a unique interface with the native Andean montane ecosystems of the *Cerros Orientales* along its eastern boundary. As a megadiverse Andean capital, Bogotá hosts a rich avifauna of over 200 species, making it an exceptional model system for urban ecology studies in the Global South. However, this ecological richness coexists with pronounced socioeconomic disparities and distinct patterns of residential segregation across its metropolitan footprint (Figure 1).

Two datasets were used. Socioeconomic stratification data for Bogotá were obtained from the Instituto Distrital de Catastro (IDECA), the city's cadastral authority; stratum 0, assigned to institutional land uses such as schools, parks, and universities rather than residential blocks, was excluded from the analysis. Bird occurrence data were obtained from the eBird platform (Sullivan et al., 2009) for all records tagged "Distrito Capital de Bogotá" between January 2010 and December 2024. This is the same base eBird dataset used in a companion, spatially explicit analysis of land value and bird richness (Mutis & Armenteras, 2026); here it is instead linked to Bogotá's official socioeconomic stratification, as described below.

Rural areas of the district were excluded from the analysis, including the Sumapaz páramo and the rural sector of the Suba locality, most notably the Thomas van der Hammen Forest Reserve. Records from Monserrate hill were also excluded, both because reliable stratification data are not available for this area and because it falls within the Eastern Hills Protective Forest Reserve, a nationally protected area with a distinct land-use regime.

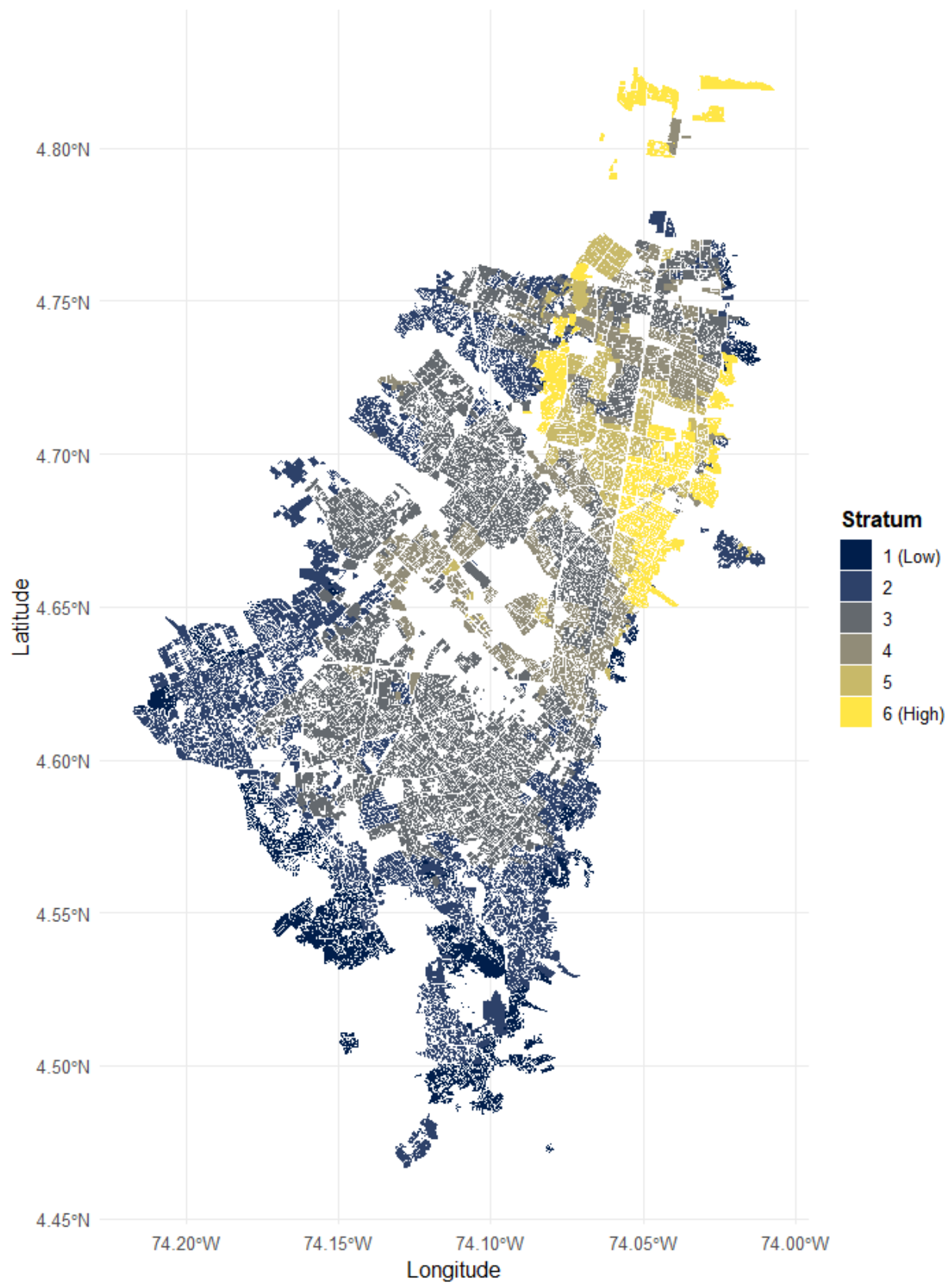


Figure 1. Spatial distribution of socioeconomic strata (Stratum 1 through 6) across the urban matrix of Bogotá, D.C., based on official cadastral data from Ideca (Infraestructura de Datos Espaciales de Bogotá). The color gradient ranges from light yellow (Stratum 1, lowest socioeconomic status and precarious infrastructure) to dark brown (Stratum 6, highest socioeconomic status and luxury amenities). Non-residential urban zones, industrial areas, and the eastern mountainous border (Cerros Orientales) are indicated with grey hatching. This official zoning system serves as the primary spatial framework for analyzing socioeconomic segregation and its ecological footprint on urban bird diversity and vegetation cover.



Figure 2. Representative aerial photographs illustrating the physical morphology and vegetation differences across Bogotá's six socioeconomic strata: (a) Tanque Laguna, (b) Lucero, (c) Tibabuyes, (d) Cedritos, (e) Niza antigua, and (f) Santa Ana. Note the transition from high-density, low-vegetation built environments in lower strata to lower-density, heavily treed neighborhoods embedded near the eastern mountain front in upper strata. Satellite imagery sourced from Google Earth.

2.2 Data corrections

The raw dataset was corrected in two steps. First, introduced domestic species: the Muscovy duck (*Cairina moschata*), the greylag goose (*Anser anser*), and domestic fowl (*Gallus gallus*), were removed. Second, species with fewer than ten records over the six-year study period were excluded, reducing the number of species considered from 582 to 258. This threshold was

considered appropriate given that the unfiltered figure of 582 species was inconsistent with the 235 species documented for the broader Bogotá savanna (Castro-Vargas et al., 2020), suggesting that the larger number included vagrants, misidentifications, or otherwise unrepresentative records. After these corrections, the dataset was reduced from 147,405 to 118,447 occurrence records, which were used in all subsequent analyses.

2.3 Spatial assignment to socioeconomic strata

Each bird occurrence was assigned to a socioeconomic stratum using the citywide cadastral stratification layer, which records the stratum of every urban block in Bogotá. Assignment was performed in ArcGIS using a Spatial Join. Given that many occurrences did not fall directly within a stratified block, instead landing in unstratified public spaces such as streets, parks, or open lots, we assigned each record the stratum of the nearest stratified block

2.4 Frequency analysis

For each of the 258 species, occurrence frequencies were tabulated by stratum and visualized as histograms to identify the stratum, or strata, in which each species was recorded most frequently.

To assess whether the spatial pattern of bird occurrences might simply track uneven observer effort rather than a genuine ecological signal, we examined the density of eBird checklists relative to the total urban area (in hectares) of each cadastral stratum, following the general data-quality recommendations of Johnston et al. (2021) for working with community-science data. Raw recording intensity was not uniform across strata; the implications of this imbalance for interpreting the results are considered directly in the Discussion (Section 4).

2.5 Ordered logistic regression

Because socioeconomic stratum is an ordinal variable with a clear ranking from lowest (1) to highest (6), we fit a separate ordered logistic (proportional-odds) model (Agresti, 2010; Hosmer et al., 2013) for each species, with stratum itself as the ordinal response variable. Each model estimates only the threshold (intercept) parameters, without additional covariates; the fitted cumulative probabilities therefore describe how that species' occurrence records are distributed across the six strata, providing a model-based counterpart to the frequency histograms in Section 3.2 rather than a presence/absence (occupancy) model. The general form of the model is:

$$\log [P(Y \leq j) / (1 - P(Y \leq j))] = a_j$$

where Y is the stratum (1–6) recorded for each occurrence of a given species, $P(Y \leq j)$ is the cumulative probability that a record falls in stratum j or below, and a_j is the threshold separating category j from $j+1$. Because the model includes no covariates, the fitted probabilities $P(Y = j)$ recovered from these thresholds are the model-based, smoothed equivalent of that species' empirical distribution across strata (Section 3.2); they should be read as the estimated share of a species' records expected to fall in stratum j , not as a probability of presence or absence. A distribution skewed toward the higher strata is consistent with the luxury-effect hypothesis; a distribution skewed toward the lower strata, or a roughly uniform one, would instead point to other factors (habitat availability or food resources, for example) as the primary drivers of a species' distribution. This analysis was conducted on 134 species from the dataset that presented sufficient data for the model to converge.

2.6 Vegetation index (NDVI) analysis

To assess whether socioeconomic segregation mediated the distribution of urban vegetation, we used the NDVI of the city's parks as a proxy. The vegetation index was extracted for all 5,315 urban parks identified within the study area using the urban parks spatial layer obtained from Ideca (Infraestructura de Datos Espaciales de Bogotá). NDVI raster that was calculated from the Harmonized Sentinel-2 Level-2A imagery, with a mosaic that was retrieved for the year 2024 using Google Earth Engine (Figure 3). Each park was assigned a mean vegetation index value, which was then linked to the park's modal socioeconomic stratum using the same **Ideca** stratification layer applied to bird occurrences (Section 2.3). Differences in mean vegetation index across strata were tested using one-way ANOVA followed by post-hoc Tukey

comparisons. The relationship between vegetation cover and bird species richness was assessed with a linear regression of park-level species richness on mean vegetation index. Spatial clustering of vegetation values across parks was tested using Moran's I, and inequality in the distribution of vegetation cover across strata was quantified using the Gini coefficient, the Theil index, and the coefficient of variation.

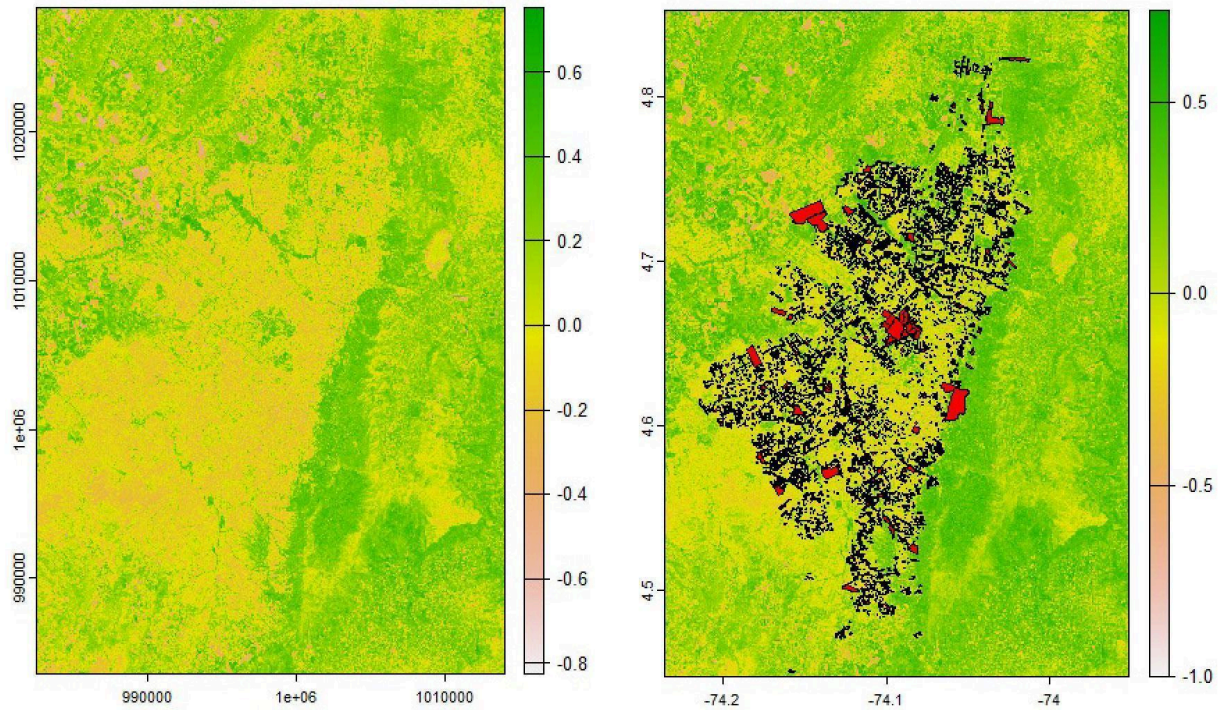


Figure 3: Spatial distribution of vegetation cover (NDVI) in the Bogotá region (left) and within the urban area (right), based on raster data and spatial layers from Ideca (Infraestructura de Datos Espaciales de Bogotá), showing the clustering of greener parks in higher socioeconomic zones.

3. Results

3.1 Overall distribution of occurrences across strata

Bird occurrences were not distributed proportionally to the area occupied by each stratum. Stratum 1 occupies 10% of the city's urban area but accounted for only 1.34% of occurrences. Stratum 2, the most extensive, covers 46.5% of the urban area yet accounted for just 13.63% of occurrences. Stratum 3 occupies 35% of the area and accounted for 32.75% of occurrences,

roughly in proportion to its size. Stratum 4, by contrast, occupies only 12% of the area but accounted for 31.71% of occurrences, indicating a disproportionately large share. Stratum 5 occupies just 6% of the area yet accounted for 13.76% of occurrences, and stratum 6 occupies 8% of the area, accounting for 6.8% of occurrences. Taken together, the three highest strata (4, 5 and 6), which occupy only 26.4% of the urban area, accounted for 52.3% of all bird occurrences, while the three lowest strata (1, 2 and 3), which occupy 73.6% of the area, accounted for only 47.7% (Figure 4). Only strata 4 and 5 showed a share of occurrences exceeding their share of urban area, indicating that the spatial distribution of bird records in Bogotá is consistent with a luxury effect.

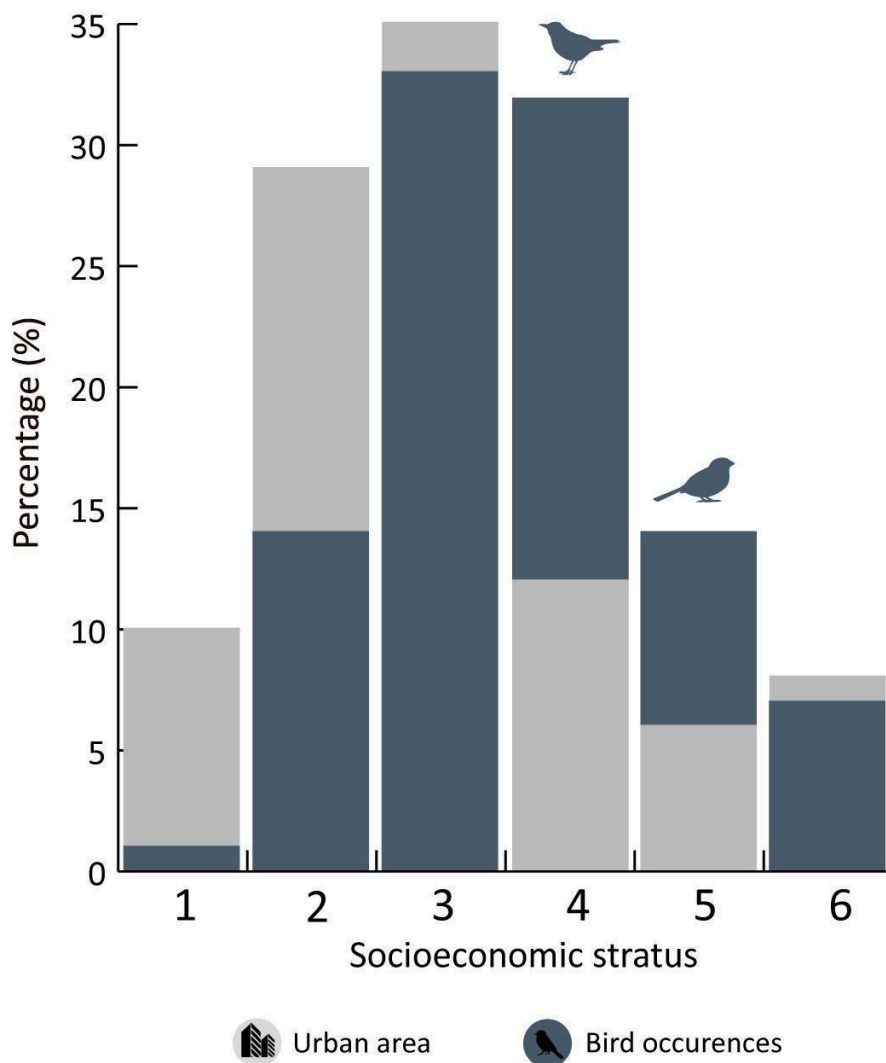


Figure 4. Bar plot comparing the percentage of urban area versus bird occurrences across socioeconomic strata (1–6) in Bogotá. Gray bars represent the proportion of urban area occupied by each stratum; blue bars represent the proportion of bird occurrences recorded in each stratum. Higher socioeconomic strata (4 and 5) show a disproportionately high share of bird occurrences relative to their area in the city. Data: IDECA (stratification) and eBird (bird occurrences).

3.2 Species-specific patterns

Comparing frequency histograms across the 258 species analyzed revealed several distinct patterns (Figure 5 & Supplementary Figure S1). Habitat generalists, understood as species capable of persisting under a wide range of environmental conditions, showed remarkably similar frequencies across all six strata. This was evident for Bogotá’s most common species, the Great Thrush (*Turdus fuscater*), the Eared Dove (*Zenaida auriculata*), the Rufous-collared Sparrow (*Zonotrichia capensis*), and the House Wren (*Troglodytes aedon*), all of which are well adapted to urban environments and are commonly classified as “urban adapters” (Douglas & James, 2015).

As species become progressively less generalist and more demanding in their habitat requirements, their frequency distributions shift increasingly toward the higher strata. The Blackburnian Warbler (*Setophaga fusca*) and the Yellow-backed Oriole (*Icterus chrysater*), while not highly specialized, are already noticeably more demanding than the thrush, dove, or sparrow, and their histograms reflect this shift (Pérez-Suárez, 2025; Yepers-Arcila & Colorado, 2025)

Bird species associated with aquatic environments, such as Bogotá’s wetlands, also showed fairly similar frequencies across strata, but with a marked concentration around strata 3 and 4. The Solitary Sandpiper (*Tringa solitaria*), the American Coot (*Fulica americana*), the Common Gallinule (*Gallinula galeata*), the Black-crowned Night-Heron (*Nycticorax nycticorax*), and the Andean Ruddy Duck (*Oxyura ferruginea*) were recorded predominantly in strata 3 and 4, where the city’s best-conserved wetlands are located (Pardo & Moncada, 2015; Rosselli, 2011); no wetland habitat is associated with stratum 6.

More habitat-demanding urban species, such as the Barn Swallow (*Hirundo rustica*) (Douglas & James, 2015), showed distributions skewed further toward the higher strata than the generalist species described above; the Barn Swallow had no records at all in stratum 1.

At the opposite end of the spectrum from the generalist species are the strict habitat specialists. The Grey-breasted Wood-Wren (*Henicorhina leucophrys*), which occurs almost exclusively in well-conserved high-Andean forest, was recorded predominantly in stratum 6 (Kroodsma et al., 2020). The same pattern held for the Black-headed Hemispingus (*Pseudospingus verticalis*), an uncommon species whose presence reflects good ecosystem condition, and for the Black-capped Tyrannulet (*Phyllomyias nigrocapillus*), which favors tall trees and well-conserved forest and was likewise recorded predominantly in stratum 6, and also related to forested Eastern Hills of the city (Stiles et al., 2021; Cracraft, 1985).

Overall, the frequency histograms show that the luxury effect is not uniform across species. Generalist species show a comparatively homogeneous distribution across Bogotá's urban area, whereas more specialized species, which require higher-quality habitat, tend to concentrate in the higher socioeconomic strata. This tendency is especially pronounced among species associated with high-Andean forest, since stratum 6 is located predominantly in the northeastern sector of the city, coinciding with the Eastern Hills. Neighborhoods classified as strata 1, 2, and 3 also exist within the Eastern Hills sector, yet the great majority of records of habitat-demanding species remain concentrated in stratum 6.

A similar tendency was observed among wetland-associated species: the Black-crowned Night-Heron (*Nycticorax nycticorax*) and the Common Gallinule (*Gallinula galeata*) were more frequently recorded in stratum-4 wetlands than in stratum-3 wetlands, suggesting that Bogotá's wetland birds may also be subject to a pronounced luxury effect, although a study focused specifically on wetlands, birds, and socioeconomic stratification would be needed to reach more conclusive results.

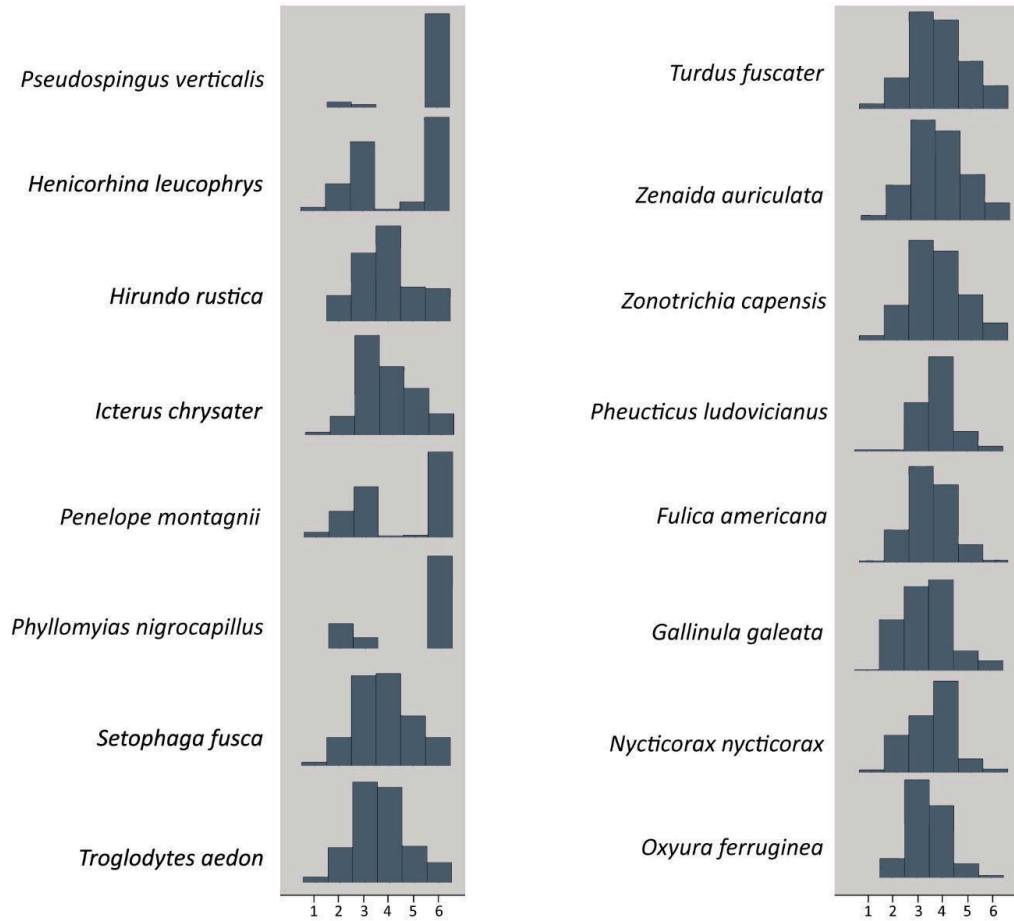


Figure 5. Frequency histograms (strata 1–6, horizontal axis) for a subset of species representing the observed patterns, from habitat generalists (right column, top rows) and wetland specialists (right column, bottom rows) to forest specialists concentrated in stratum 6 (left column). Data: eBird occurrences assigned to IDECA socioeconomic strata.

3.3 Ordered logistic regression

The per-species ordered logistic models revealed clear patterns consistent with the luxury-effect hypothesis, which posits that areas of higher socioeconomic status tend to host greater bird diversity and abundance. For the great majority of species analyzed (85–95%), the estimated share of records falling in strata 1 and 2 was low, indicating that few occurrences of most species were registered in these areas. In stratum 1, the estimated share was generally very low (mostly below 0.05, or 5%), consistent with the low overall number of occurrences recorded in this stratum (Section 3.1). This pattern reflects unfavorable socioeconomic and environmental conditions for sustaining high bird diversity in stratum 1.

In stratum 2, the estimated share of records was somewhat higher than in stratum 1, but still relatively low, generally ranging between 0.05 and 0.20 (5–20%). This indicates that, while some species have a meaningful share of their records in these areas, that share remains limited relative to the middle and upper strata.

These results demonstrate that the distribution of birds in Bogotá is strongly related to socioeconomic stratum, although the magnitude of the relationship varies considerably across species: while most species have few records in the lowest strata (1 and 2), the strength and shape of the relationship differs from species to species, as summarized for seven representative species in Table 1 (see Supplementary Table S2 for full species-level regression results).

Stratum 4 stood out as the stratum with the largest estimated share of records for most species, both because it combines adequate infrastructure with substantial green space and because it is the stratum associated with the largest overall number of occurrences. In general, the results point to clear patterns in which several species have a disproportionately large share of their records in the higher socioeconomic strata (4–6).

Table 1. Estimated share of occurrence records by socioeconomic stratum for seven representative species, from per-species ordered logistic models with stratum as the ordinal response (intercept/threshold-only; no covariates).

<i>Species</i>	Socioeconomic stratum	Estimated P (record in stratum)
<i>Turdus fuscater</i> (Great Thrush)	1	0.010
	2	0.128
	3	0.313
	4	0.360
	5	0.133
	6	0.056
<i>Colibri coruscans</i> (Sparkling Violetear)	1	0.008
	2	0.114
	3	0.337
	4	0.371
	5	0.118
	6	0.051
<i>Diglossa sittoides</i> (Rusty Flowerpiercer)	1	0.003

<i>Species</i>	Socioeconomic stratum	Estimated P (record in stratum)
	2	0.090
	3	0.343
	4	0.498
	5	0.044
	6	0.021
<i>Piranga olivacea</i> (Scarlet Tanager)	1	0.003
	2	0.063
	3	0.323
	4	0.442
	5	0.135
	6	0.034
<i>Zonotrichia capensis</i> (Rufous-collared Sparrow)	1	0.010
	2	0.144
	3	0.317
	4	0.348
	5	0.136
	6	0.044
<i>Tyrannus melancholicus</i> (Tropical Kingbird)	1	0.009
	2	0.183
	3	0.352
	4	0.356
	5	0.076
	6	0.024
<i>Fulica americana</i> (American Coot)	1	0.004
	2	0.216
	3	0.422
	4	0.278
	5	0.072
	6	0.007

3.4 Vegetation cover (NDVI) across strata

To complement the analysis of bird diversity, the Normalized Difference Vegetation Index (NDVI) was examined as an indicator of vegetation cover and quality across Bogotá's urban parks. Mean NDVI values were calculated for each park from Sentinel-2 imagery and then

assigned to the park's modal socioeconomic strata. This allowed direct comparison between vegetation structure and the city's stratified socioeconomic landscape.

The results reveal a clear gradient: parks located in strata 1 and 2 exhibit negative or near-zero NDVI values, reflecting sparse or degraded vegetation, while parks in strata 5 and 6 show consistently higher NDVI values, indicative of denser and healthier vegetation cover. Intermediate strata (3–4) display transitional conditions, with NDVI values rising steadily along the socioeconomic gradient. Figure 6 illustrates this pattern, showing that vegetation amount is disproportionately concentrated in wealthier strata.

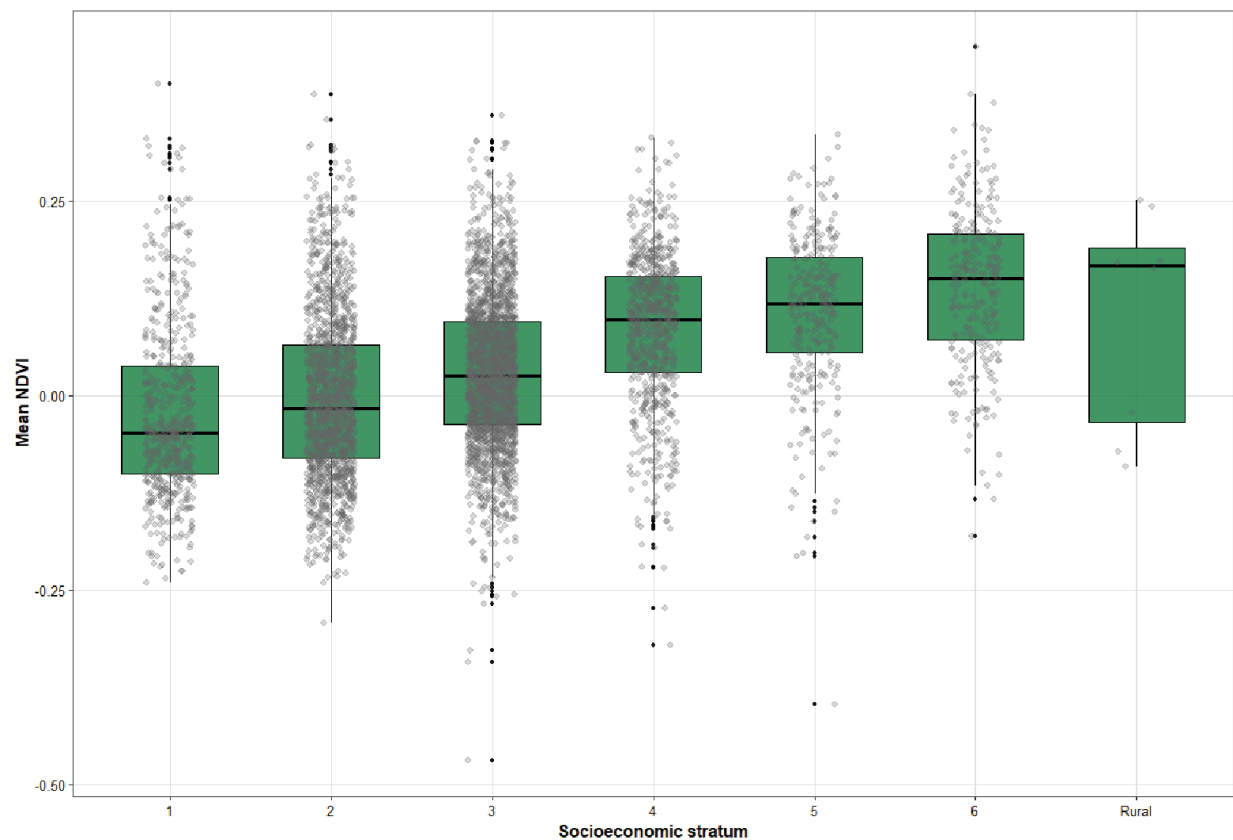


Figure 6. Mean NDVI values across Bogotá's socioeconomic strata. Vegetation cover increases steadily from the lowest strata (1–2) to the highest (5–6), with rural areas showing high but more variable NDVI values. Boxplots show median, interquartile range, and outliers (Tukey post-hoc, $p < 0.05$).

One-way ANOVA followed by post-hoc Tukey tests confirmed that mean vegetation index values differed significantly across strata ($p < 0.05$). Parks in strata 4–6 exhibited consistently higher values than those in strata 1–3, with differences ranging from 0.05 to 0.16 units. Comparisons with rural areas were less consistent, reflecting greater heterogeneity in vegetation outside the urban matrix.

Bird species richness in urban parks showed a positive relationship with mean vegetation index ($\beta = 72.7$, $p < 0.001$) (Figure 7), although the model explained only about 7% of the variation in richness, indicating that vegetation cover is one among several drivers of avian diversity, alongside factors such as park size, connectivity, management and tree richness (Mutis & Armenteras, 2026). Spatial autocorrelation analysis showed that vegetation values were significantly clustered across the city (Moran's $I = 0.45$, $p < 0.001$), meaning that greener parks are concentrated in specific, largely higher-stratum areas rather than distributed at random. Inequity metrics computed across strata, the Gini coefficient (0.13), Theil index (0.03), and coefficient of variation (0.22), further confirmed an unequal distribution of vegetation cover across Bogotá's socioeconomic landscape.

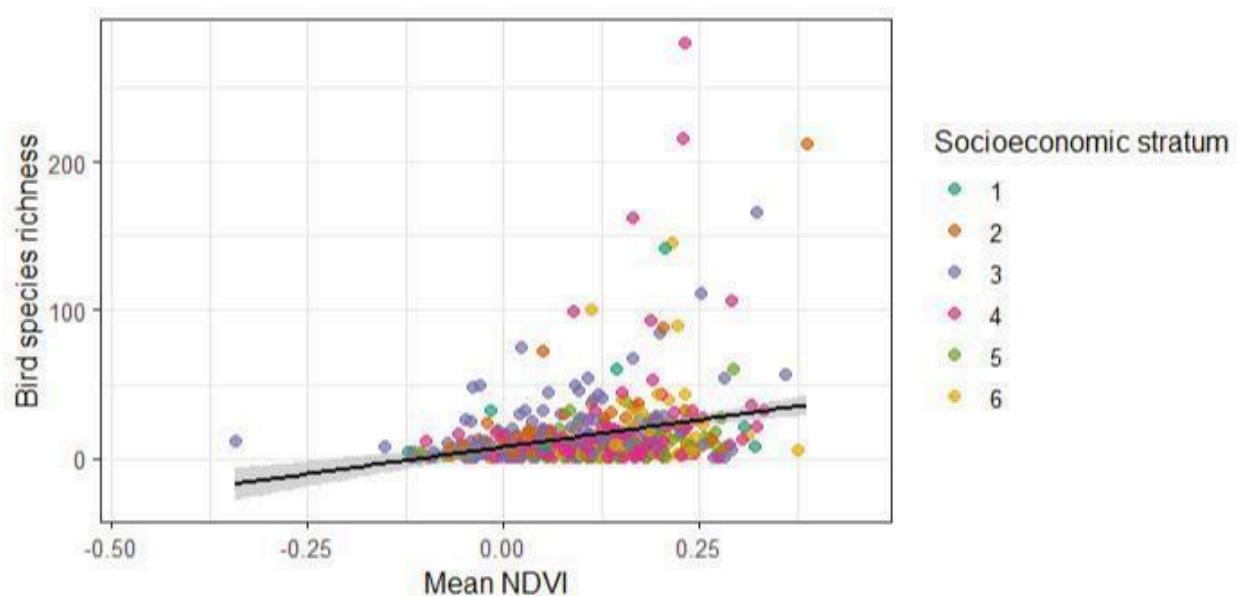


Figure 7. Relationship between mean vegetation index (NDVI) and bird species richness across urban parks, colored by socioeconomic stratum.

4. Discussion

While continuous economic gradients like cadastral land value predict avian richness in Bogotá (Mutis & Armenteras, 2026), this study demonstrates that the city's official strata system translates the general 'luxury effect' into explicit, state-enforced socio-spatial segregation. Rather than a mere proxy for income, the strata is a bounded bureaucratic cartography, determining public investment, utility subsidies, and social stigma, that actively sorts bird diversity across discrete territories. Consequently, the three highest strata (4–6), occupying barely a quarter of the urban area, concentrate over half of all bird occurrences, creating a distinct ecological peak in stratum 4 that continuous metrics inherently obscure. While extending the global literature on neighborhood affluence and biodiversity (Hope et al., 2003; Leong et al., 2018) to a heavily segregated Latin American metropolis (Kuras et al., 2020), these findings align with evidence from South Africa (Venter et al., 2020) to show that where segregation is institutionalized, its ecological footprint operates along categorical lines, proving that the boundaries separating human social worlds simultaneously carve the city into unequal ecological compartments.

At the same time, the species-level analysis shows that the luxury effect in Bogotá is far from uniform. Habitat generalists or the “urban adapters” described by Douglas and James (2015), were recorded at similar frequencies across all six strata, indicating that their distribution is largely decoupled from socioeconomic status. This is consistent with the broader literature on urban tolerance in birds, in which generalist traits such as broad diet breadth and behavioral flexibility allow certain species to thrive throughout the urban matrix regardless of neighborhood affluence (Chace & Walsh, 2006). By contrast, species with more specific habitat requirements, particularly those associated with well-conserved high-Andean forest (such as the Grey-breasted Wood-Wren, the Black-headed Hemispingus, and the Black-capped Tyrannulet) were concentrated overwhelmingly in stratum 6, the highest stratum in the city and the one most closely associated with the forested Eastern Hills (Stiles et al., 2021). This pattern suggests that, for habitat specialists, the availability of structurally complex, well-conserved vegetation, itself a function of both topography and differential investment in green infrastructure, is the primary factor mediating the luxury effect, rather than affluence per se.

Wetland-associated species presented a partial exception to this pattern. Species such as the American Coot, the Common Gallinule, and the Black-crowned Night-Heron were concentrated in strata 3 and 4, where Bogotá's best-conserved wetlands are located, rather than in the highest

strata, since no wetland habitat exists within stratum 6. This suggests that, for wetland specialists, habitat availability constrains the expression of the luxury effect more directly than socioeconomic status alone. Nonetheless, the tendency for these same species to be recorded more frequently in stratum-4 wetlands than in stratum-3 wetlands hints that a luxury effect may still operate within wetland habitats themselves, mediated by differences in the ecological condition or management of individual wetlands across strata. This finding is broadly consistent with a parallel, spatially explicit analysis of the same eBird dataset, which similarly found that aquatic species were less strongly governed by land value than terrestrial species, since their occurrence is shaped primarily by the presence of wetland habitat itself (Mutis & Armenteras, 2026). A study focused specifically on wetlands, water quality, and socioeconomic status would be needed to test this possibility directly.

The per-species ordered logistic models reinforce these patterns at the individual species level. For most species examined, the estimated share of records rose steadily from stratum 1 through stratum 4 before declining again in strata 5 and 6, producing a pattern in which stratum 4 – rather than the wealthiest stratum, 6 – held the largest share of records for most species. This likely reflects the combination of adequate green infrastructure and, simply, the very high overall number of records concentrated in this intermediate-to-upper stratum. *Diglossa sittoides* showed the most markedly positive relationship between stratum and share of records among the species examined, while *Fulica americana*, an aquatic species, showed comparatively little differentiation between strata 2 and 3, consistent with the wetland-driven pattern described above.

These findings echo those obtained for cities of the Global North, where the luxury effect was first documented and where it has since been shown to result from a combination of larger, more diverse private and public vegetation, greater availability of food and nesting resources, and reduced levels of anthropogenic disturbance in wealthier neighborhoods (Hope et al., 2003; Leong et al., 2018). They also converge with evidence from other developing-world cities: a comparable test of the luxury effect for birds in South Africa likewise found the effect to be present, though its strength varied with the surrounding level of urbanization (Chamberlain et al., 2019). Bogotá's highly formalized system of socioeconomic stratification, together with its well-documented inequalities in access to urban forest cover (Escobedo et al., 2015) and green

space (Csomós et al., 2021), provides a particularly explicit institutional mechanism through which such environmental inequalities are reproduced.

The vegetation data reinforce this picture and speak directly to the observer-bias concern raised below. Mean NDVI rose steadily from the lowest to the highest socioeconomic strata, these trends are consistent with known drivers of urban greenness around the world, which include government policies and human activities combined with bioclimatic factors (Reyes-Avila, 2024; Dutta et al. 2022, Liu et al., 2005). Parks with higher vegetation index values hosted significantly greater bird species richness. Because NDVI is measured independently of birdwatcher activity, this convergence between two unrelated data sources makes it considerably less plausible that the gradient in bird occurrences documented here is solely an artifact of uneven citizen-science effort. It also points to a plausible mechanism: Bogotá's socioeconomic segregation appears to concentrate not only birdwatchers but vegetation itself in wealthier strata, and bird diversity tracks that vegetation. In this sense, the city's segregation produces a dual ecological sorting: Bird diversity and its supporting vegetation base, which are partitioned along the same administrative boundaries that divide the human population, thereby also fragmenting the resources upon which urban wildlife relies.

Several limitations should be considered when interpreting these results. First, eBird records are generated by volunteer observers, and observer effort is unlikely to be spatially uniform across the city; wealthier, more accessible, or more frequently visited neighborhoods may simply attract more birdwatchers, independent of underlying bird diversity (Johnston et al., 2021). While this sampling bias cannot be ruled out from the eBird data alone, the independent NDVI evidence described above makes a purely observational artifact less likely, and any residual bias would in any case be expected to inflate rather than fully explain the magnitude of the disparities reported here, particularly the concentration of specialist forest species in a single stratum tied to a specific topographic and ecological setting. Second, the analysis relies on a coarse, administratively defined six-tier stratification rather than on finer-scale habitat variables such as canopy cover, vegetation structure, or noise and light pollution, which are known to influence bird communities directly and which future work, including spatially explicit models based on land value and tree diversity (Mutis & Armenteras, 2026), is better placed to capture.

These caveats notwithstanding, the results carry clear implications for urban planning and conservation in Bogotá and in comparable cities of the Global South. If access to biodiverse urban nature is concentrated in the wealthiest neighborhoods, then the well-documented psychological, recreational, and ecological benefits of everyday contact with birds are similarly concentrated, compounding existing socioeconomic disparities (Rigolon et al., 2018). Targeted investment in green infrastructure – street trees, parks, and wetland restoration – in the lowest strata, where both bird occurrences and area-adjusted green space are currently scarcest, would directly address this imbalance and represents one of the more tractable levers available to urban planners seeking to reduce environmental inequality without requiring broader shifts in income distribution.

4.1 Implications for Policy and Planning

Our findings demonstrate that Bogotá’s socioeconomic segregation has a tangible ecological counterpart: bird richness and vegetation cover are disproportionately concentrated in higher strata. This unequal distribution of biodiversity implies that access to the psychological, recreational, and ecological benefits of urban nature is stratified along the same boundaries that divide the city’s population. For urban planners and policymakers, this highlights the need to integrate environmental justice into green-infrastructure strategies. Specifically, investments in park restoration, wetland conservation, and afforestation should prioritize lower strata neighborhoods, where ecological deficits are most pronounced. Addressing these disparities would not only enhance biodiversity but also reduce social inequities. More broadly, our results suggest that in highly segregated cities of the Global South, equitable green planning must explicitly confront the ecological consequences of socioeconomic stratification.

5. Conclusion

This analysis of 118,447 eBird records collected across Bogotá between 2010 and 2024 shows that the city’s socioeconomic segregation is mirrored in the spatial distribution of its bird diversity: the wealthiest, most segregated-into strata host a disproportionate share of bird occurrences relative to the urban area they occupy, while the poorest strata host a disproportionately small share. This ecological expression of segregation, however, is not uniform across species. Habitat generalists are distributed largely independently of stratum,

wetland specialists track the location of well-conserved wetlands more than stratum per se, and forest specialists are concentrated overwhelmingly in the single highest stratum, which coincides with the city's best-conserved high-Andean forest. A complementary analysis of the vegetation index (NDVI) across 5,315 urban parks showed that vegetation cover follows this same gradient, rising steadily from the lowest to the highest strata and correlating positively with bird species richness. Together, these results suggest that in Bogotá, as in other cities where segregation is spatially explicit, access to biodiverse urban nature (and to the vegetation that sustains it) follows the same lines that divide the city socially. This is a crucial distinction with direct implications for how green-infrastructure investment should be targeted in Bogotá and other rapidly urbanizing, highly segregated cities of the Global South.

Declarations

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Conflict of interest: The authors declare no competing interests.

Data availability: Bird occurrence data are publicly available from eBird (<https://ebird.org>). Socioeconomic stratification data and urban park spatial layers were obtained from IDECA (Infraestructura de Datos Espaciales de Bogotá) (<https://www.ideca.gov.co>).

Author contributions: R.M. conceived the study, performed the analyses, and wrote the manuscript. S.A. contributed to the analyses and manuscript writing.

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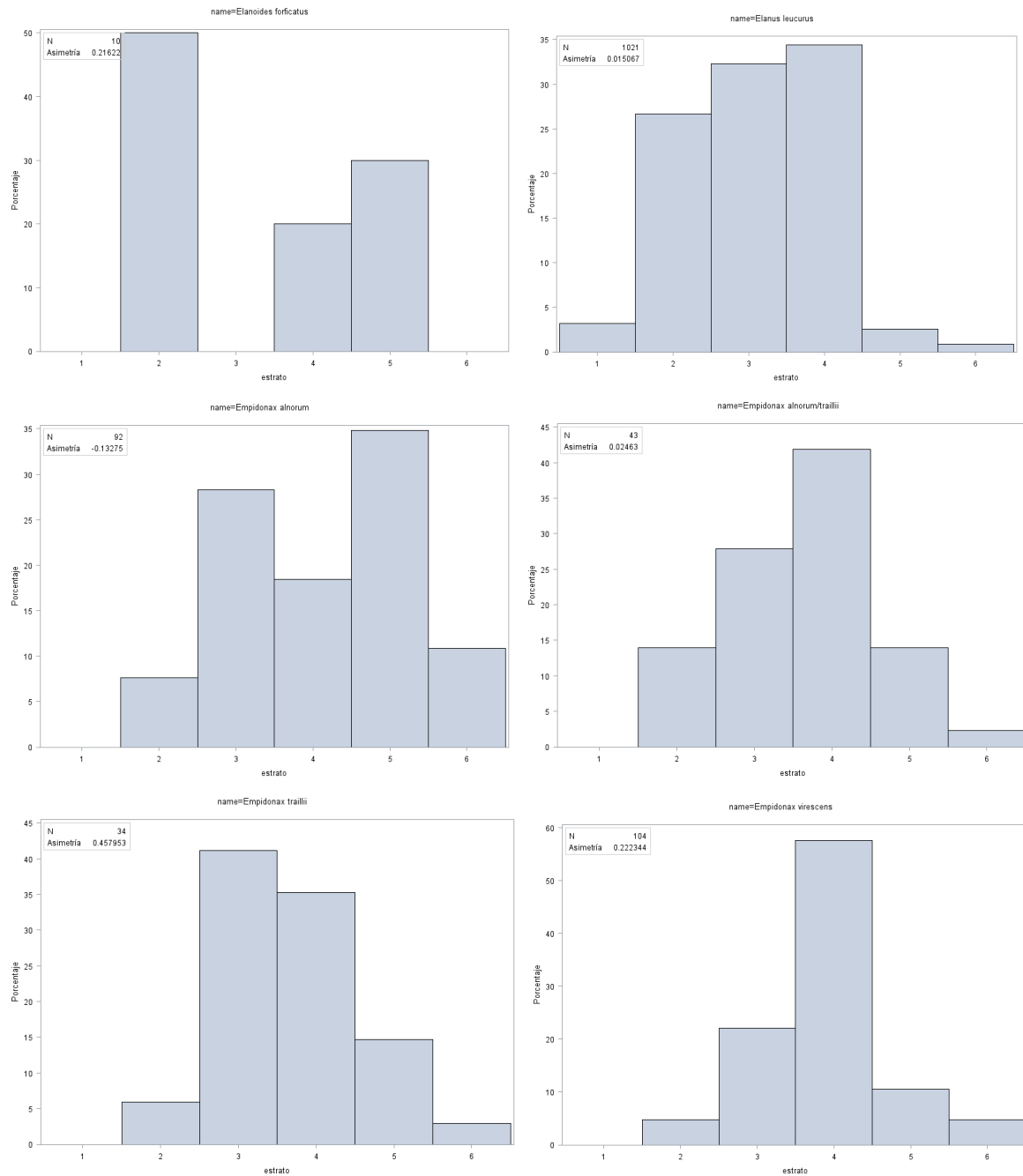
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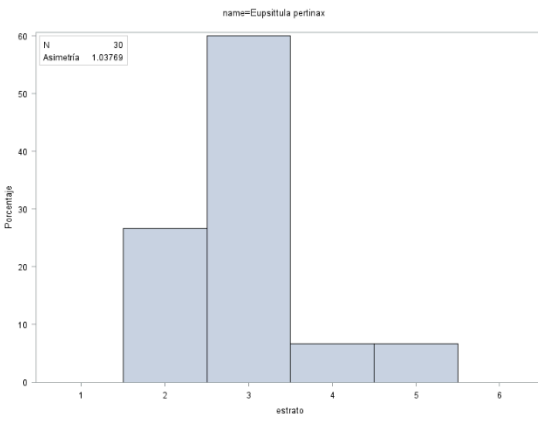
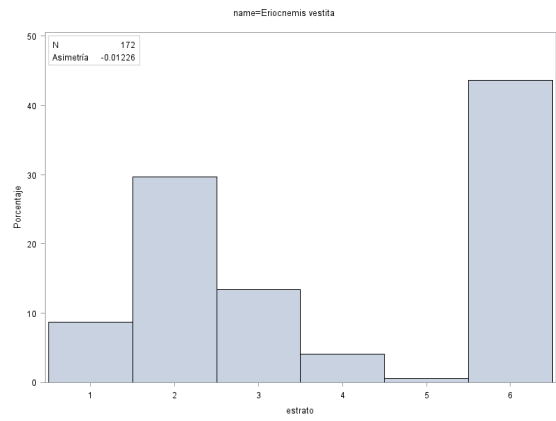
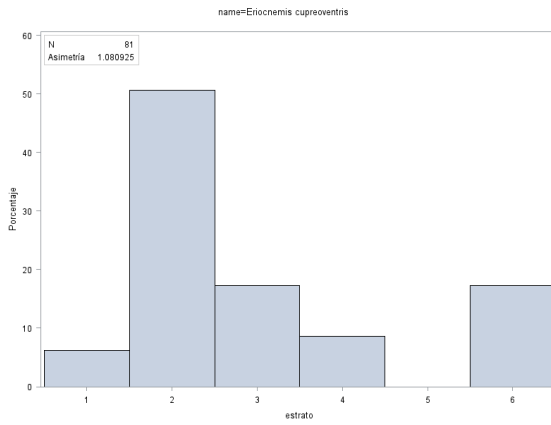
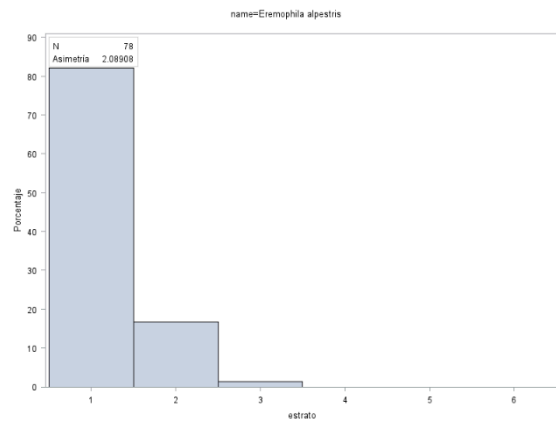
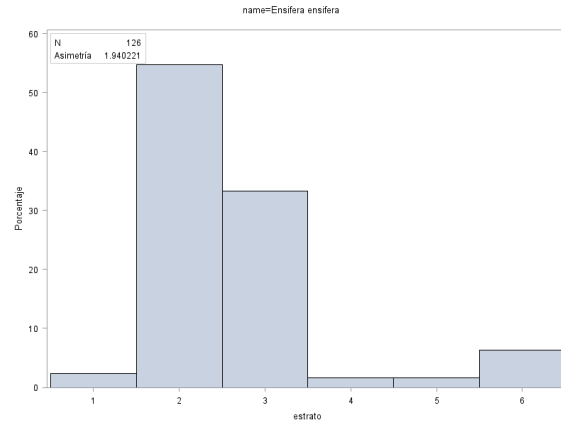
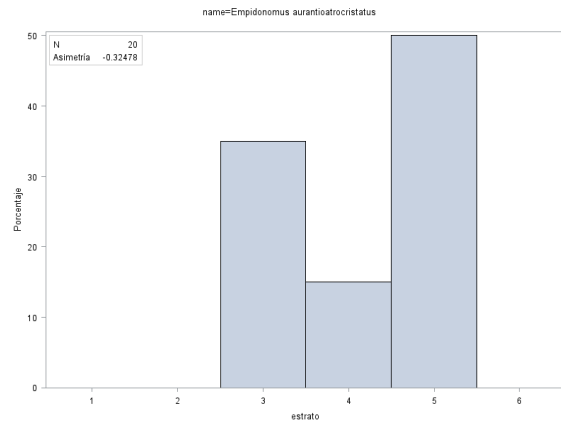
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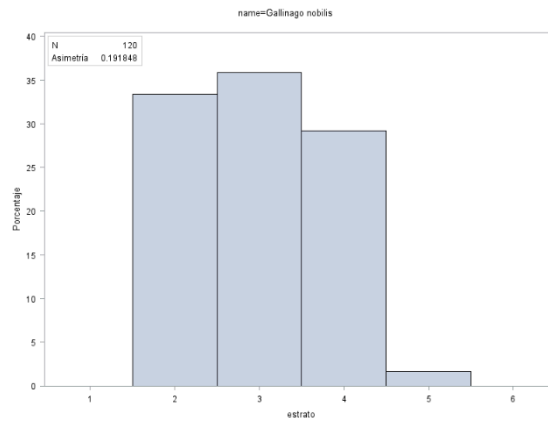
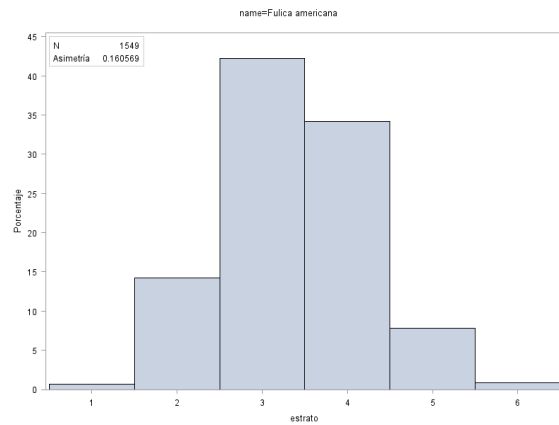
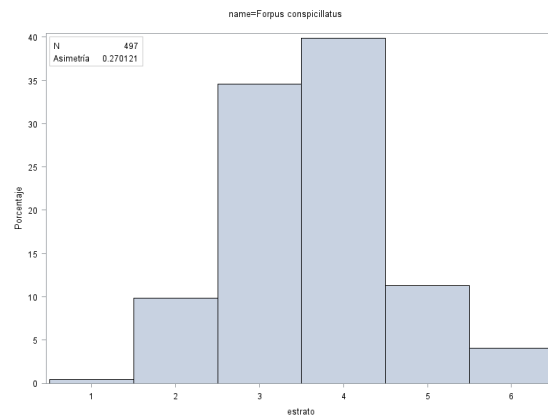
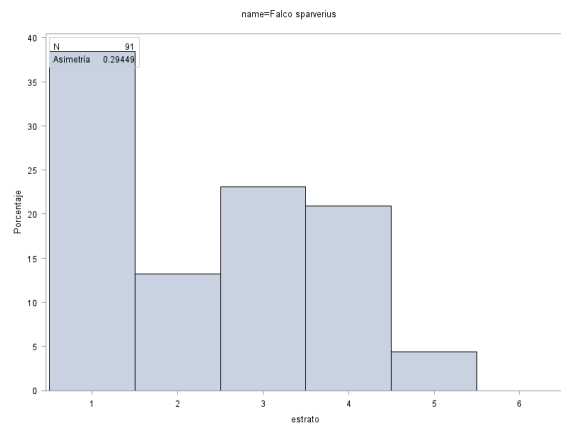
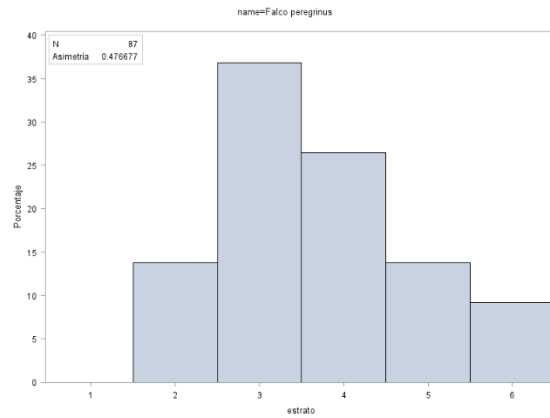
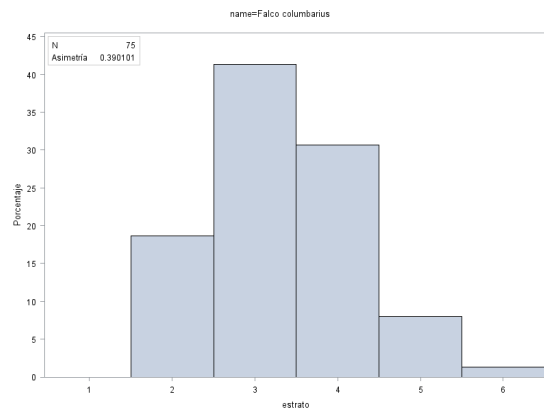
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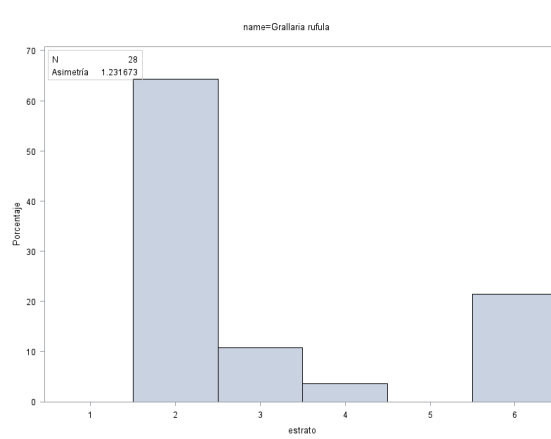
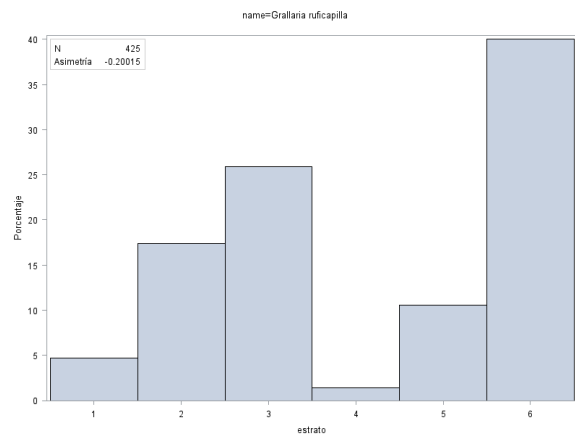
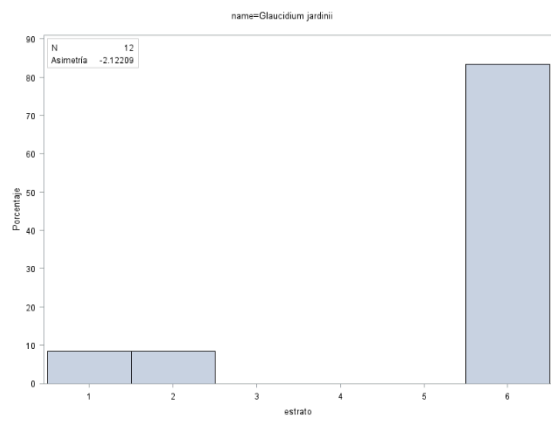
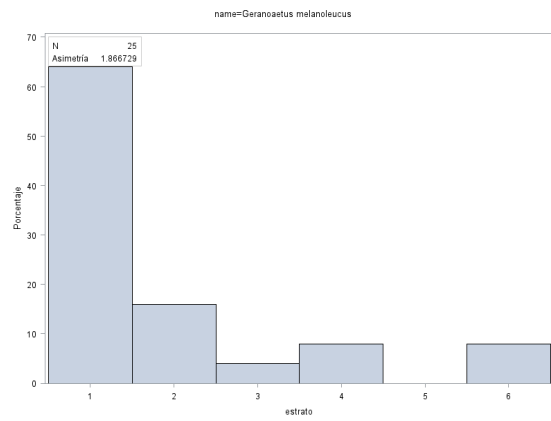
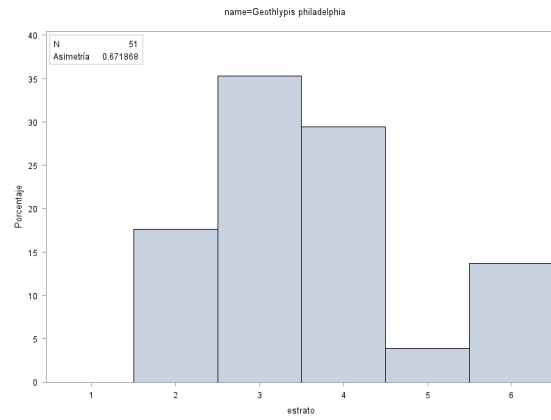
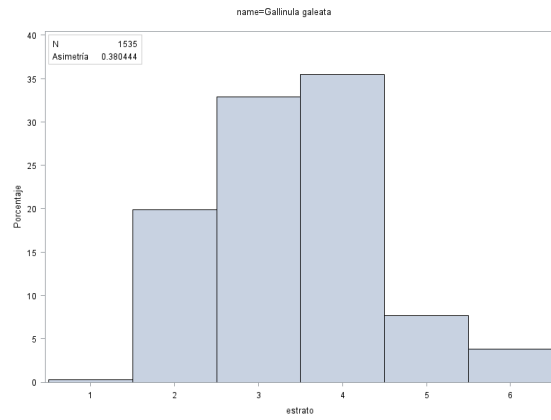
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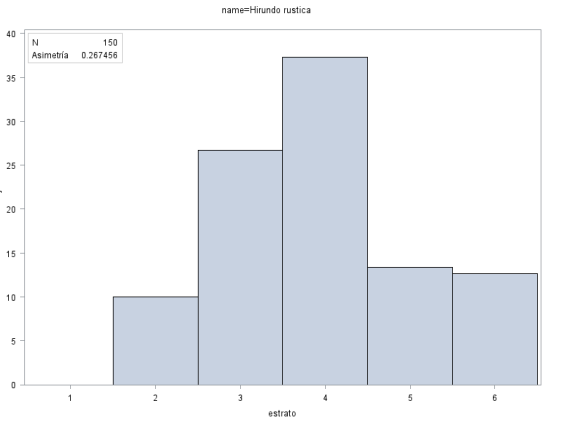
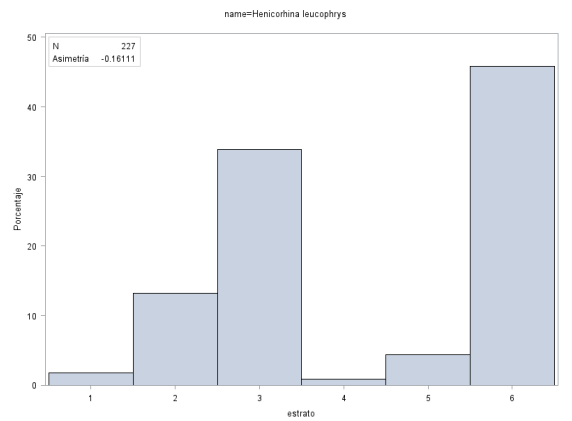
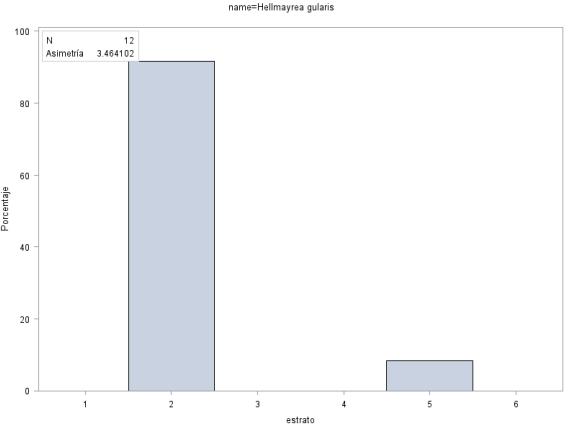
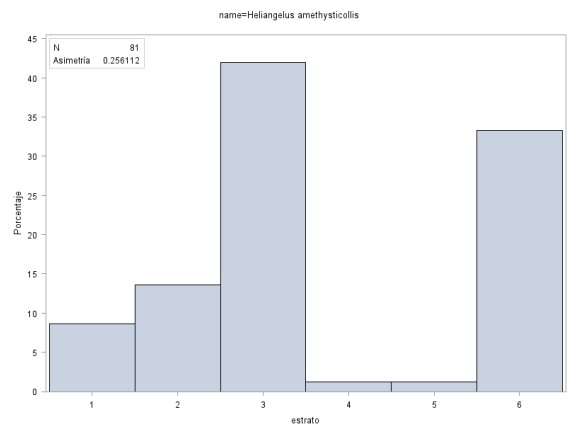
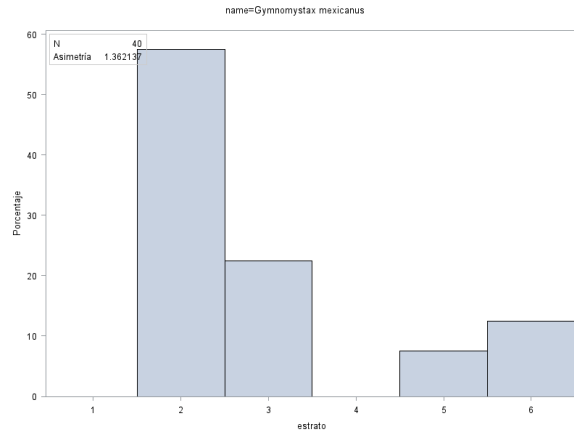
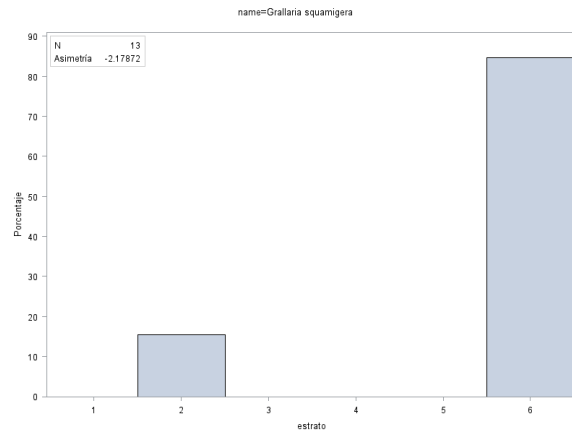
Supplementary Figures

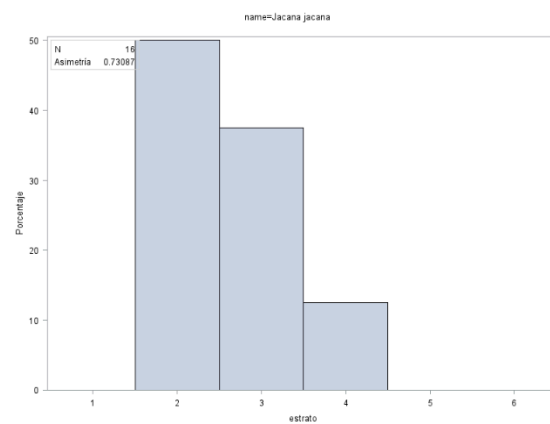
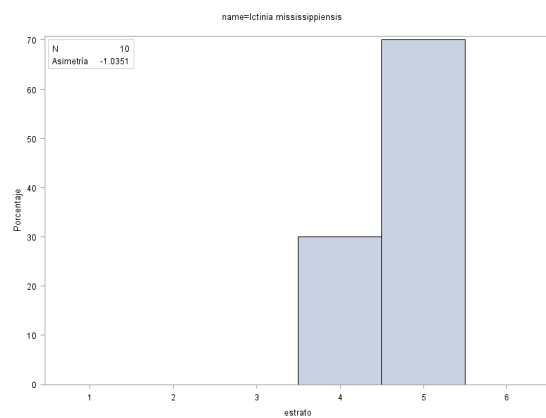
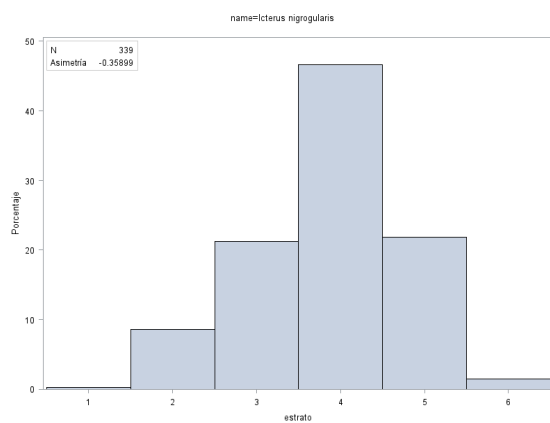
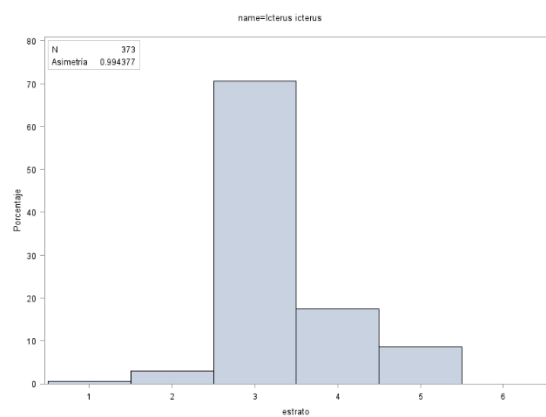
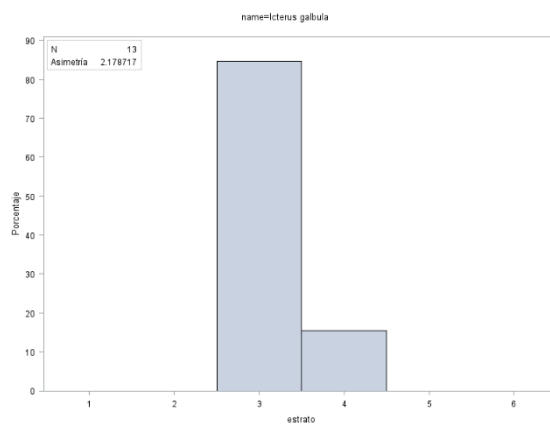
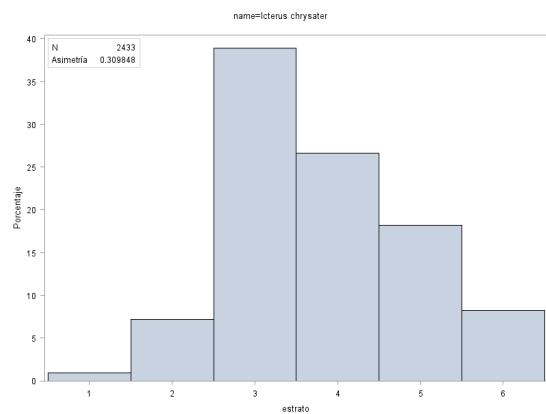


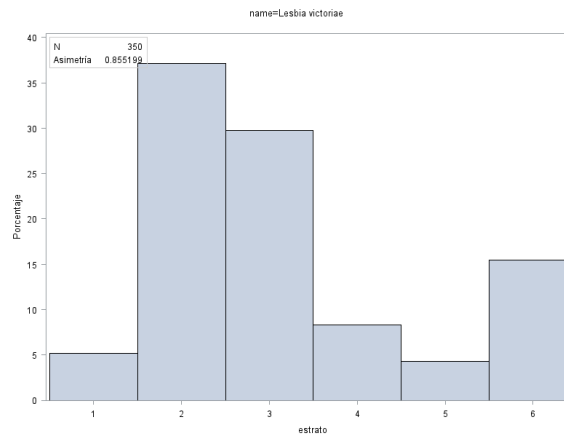
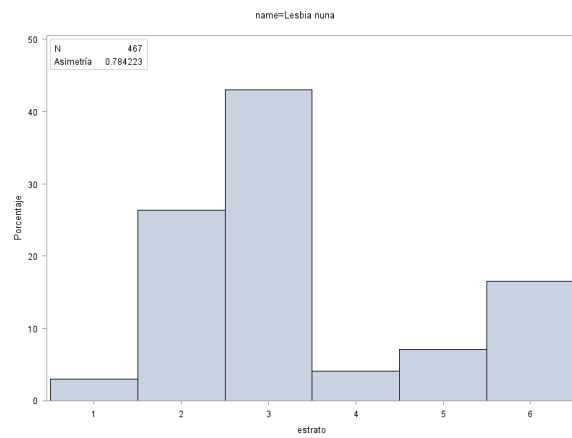
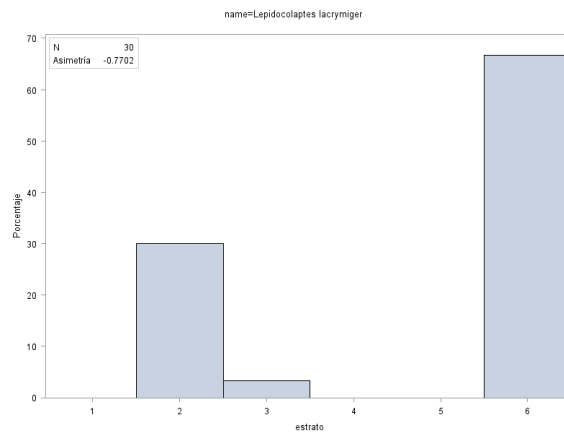
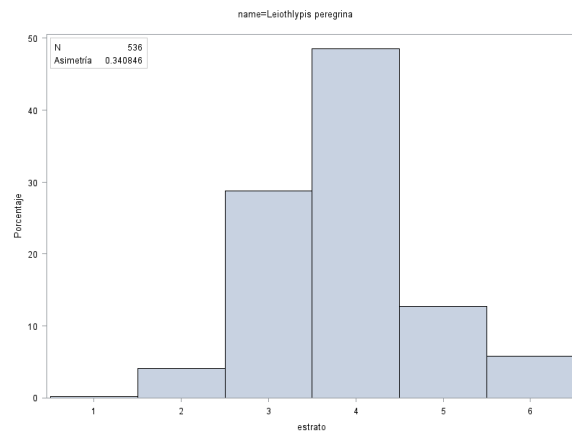
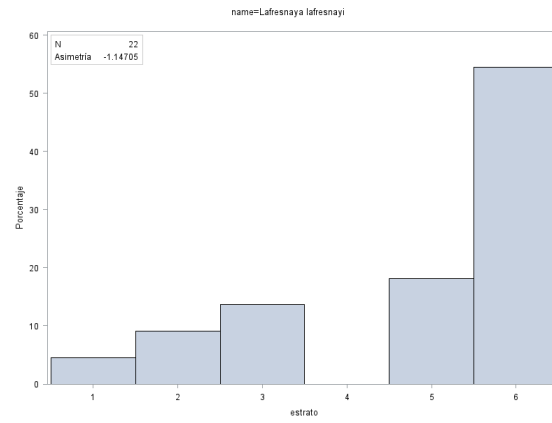
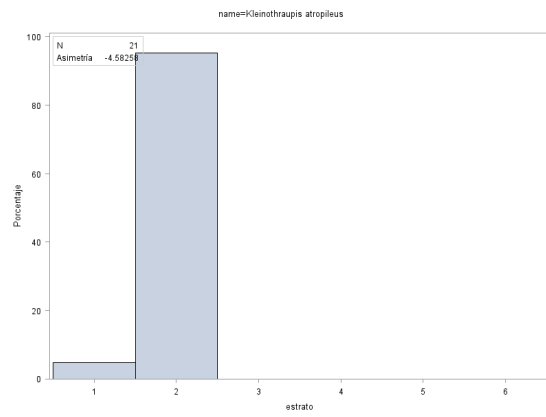


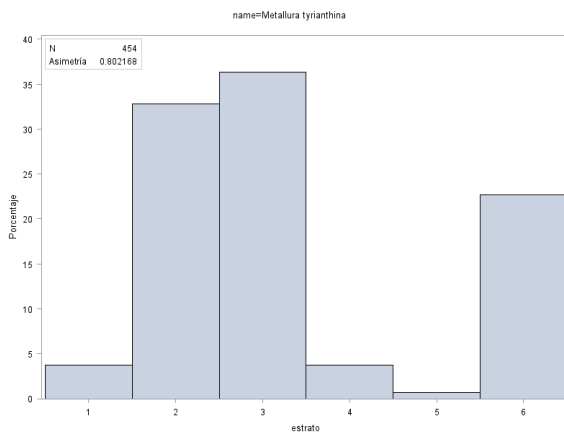
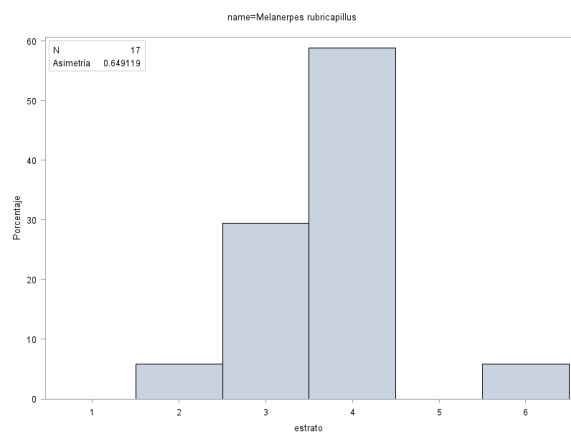
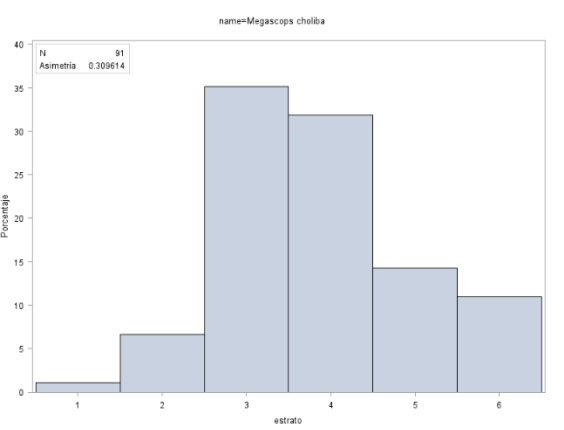
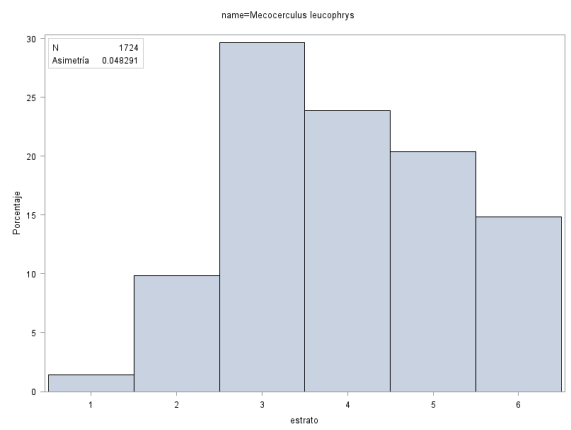
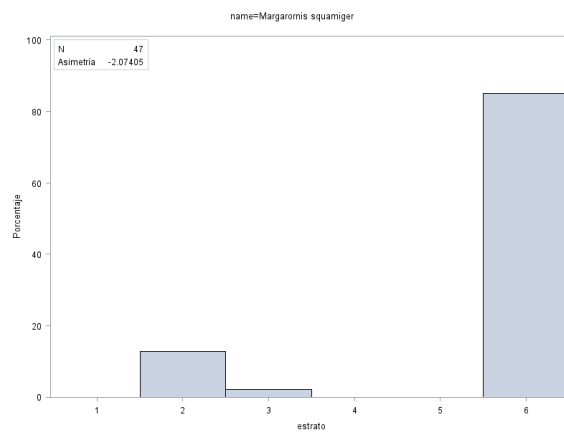
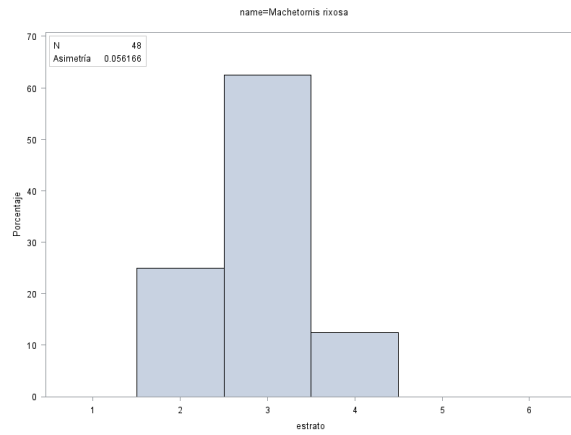


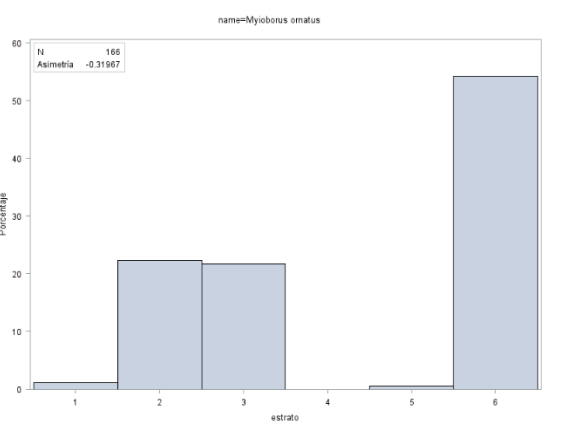
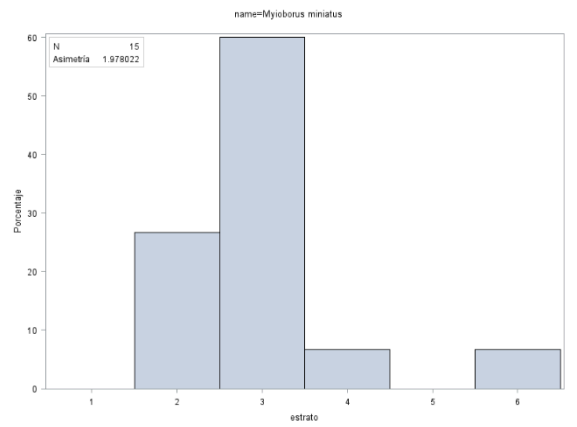
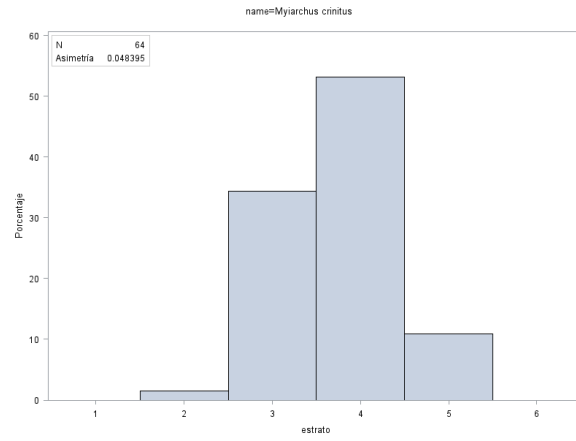
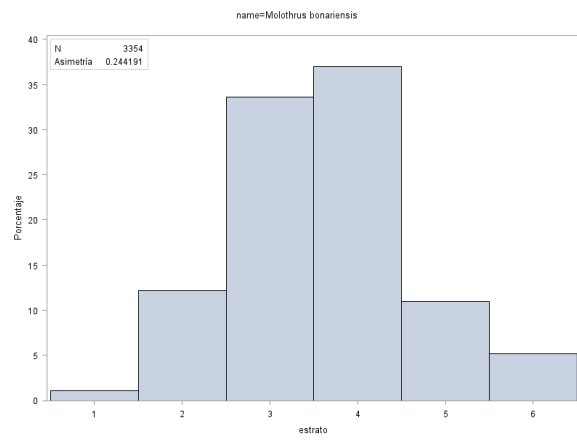
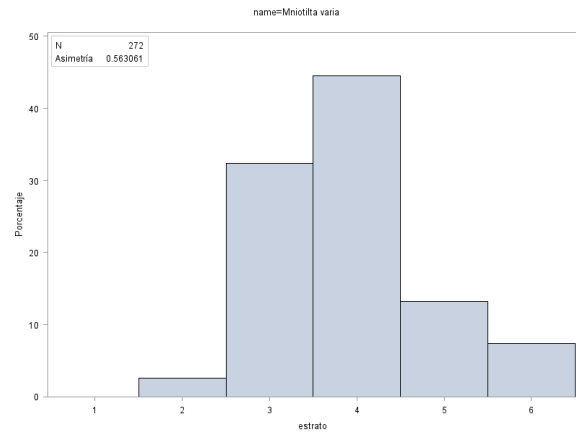
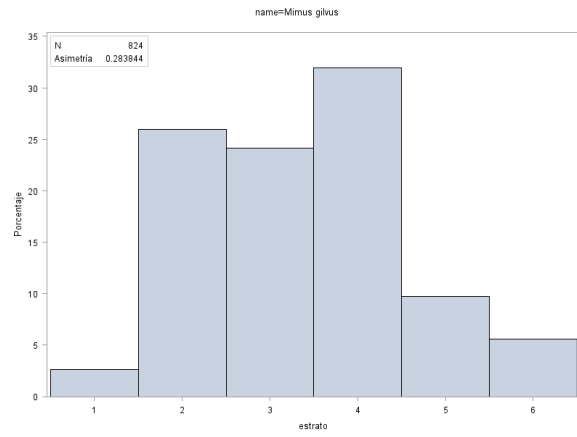


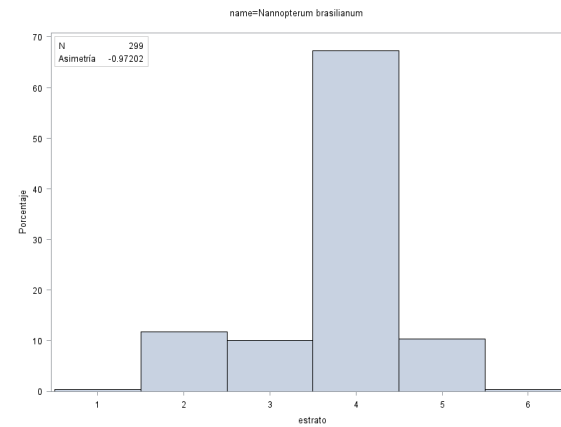
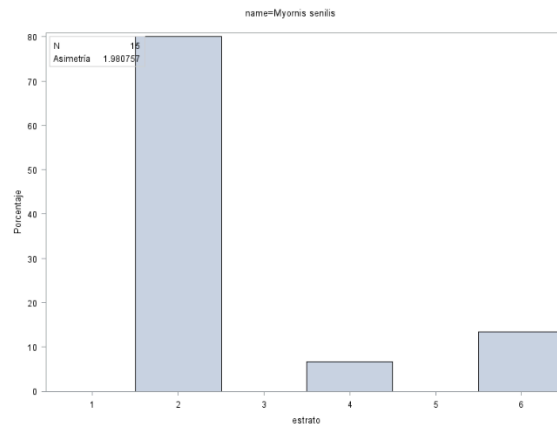
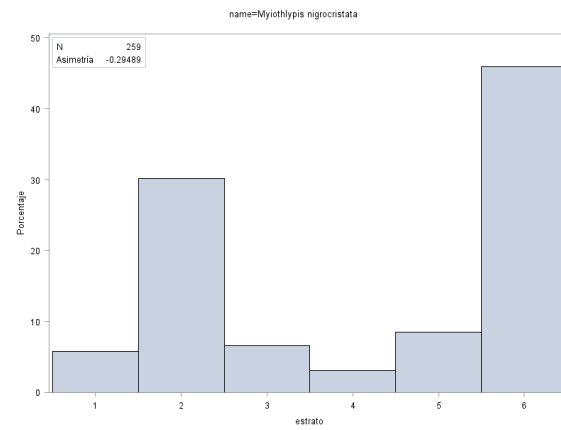
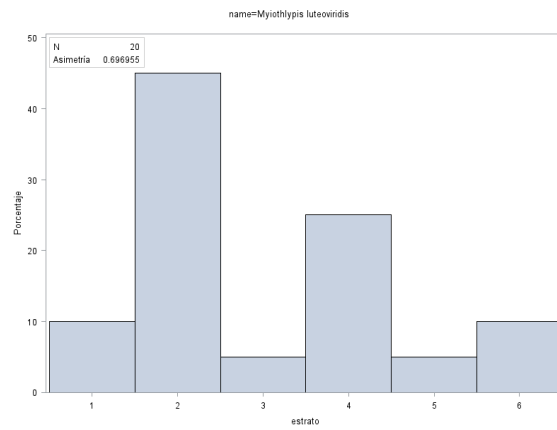
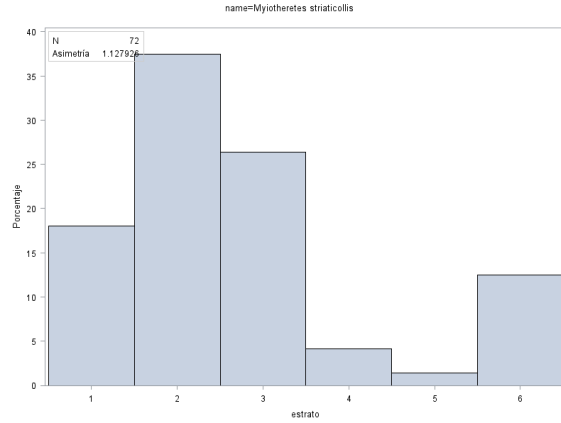
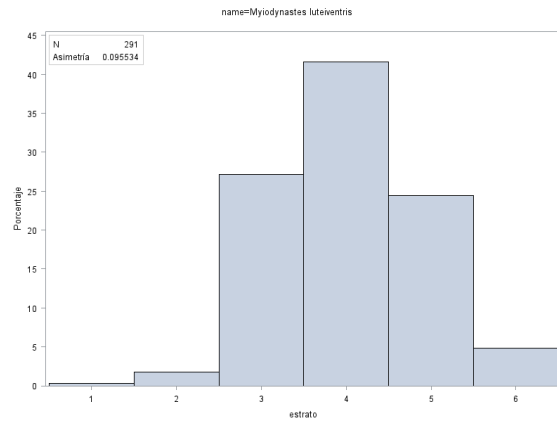


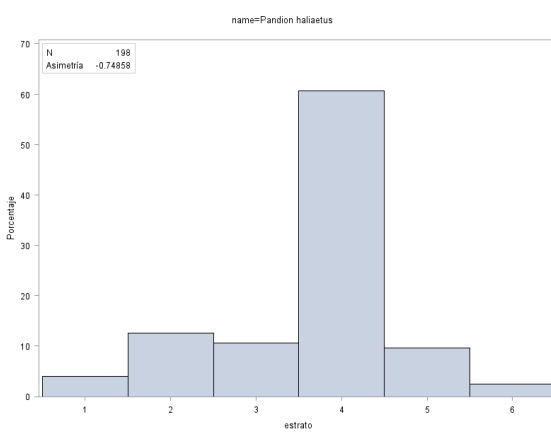
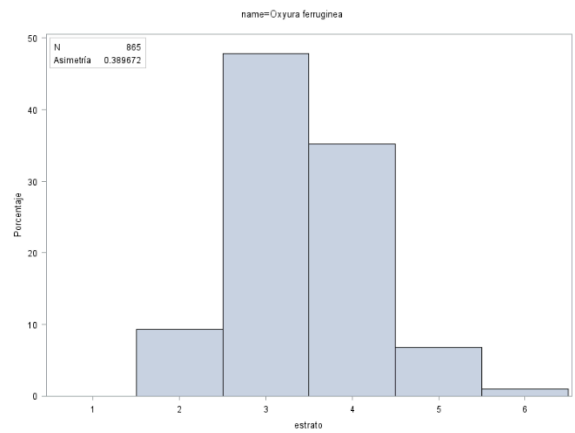
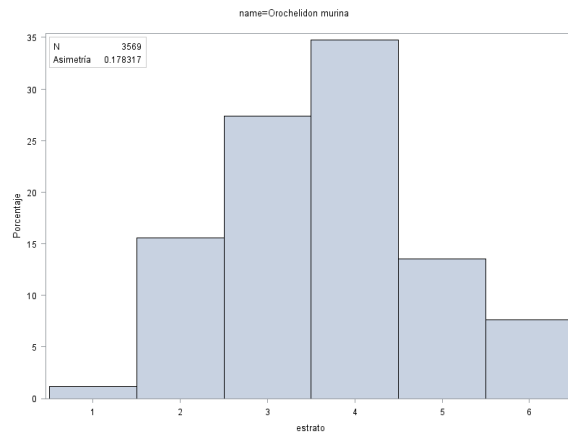
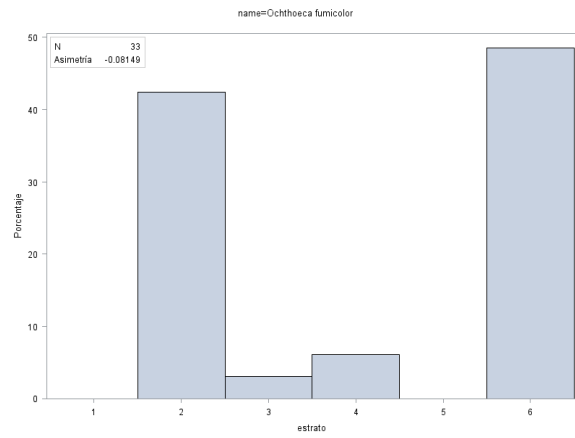
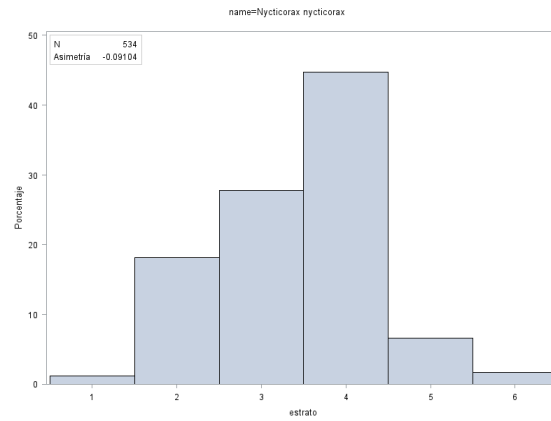
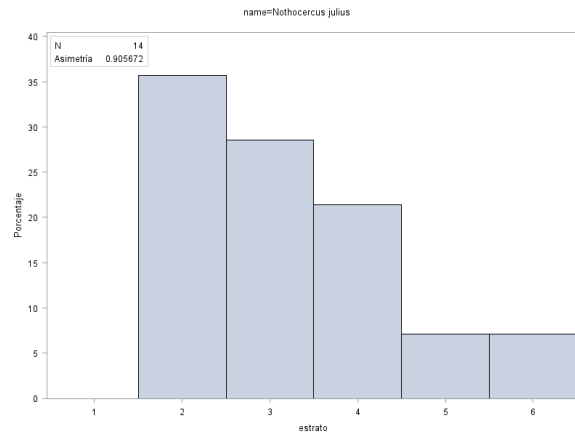


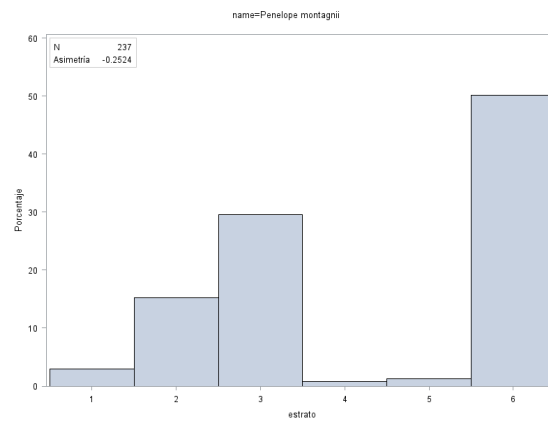
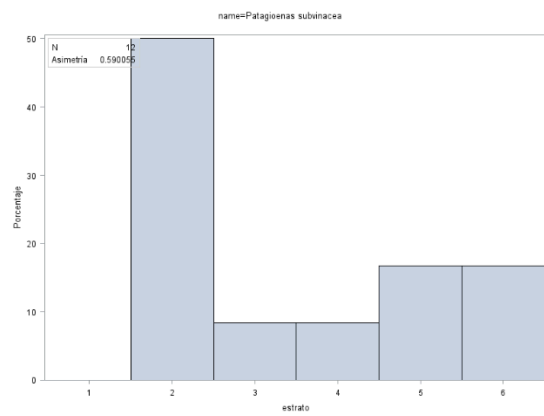
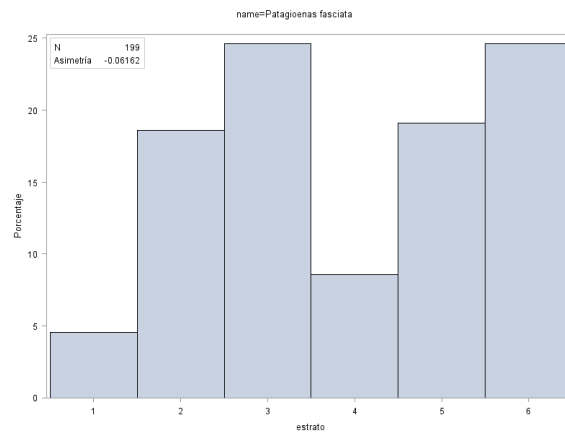
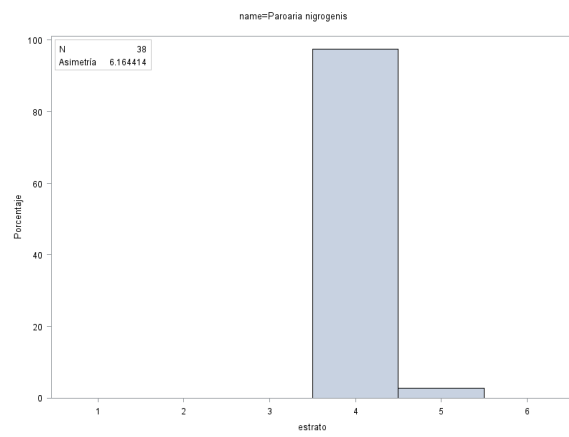
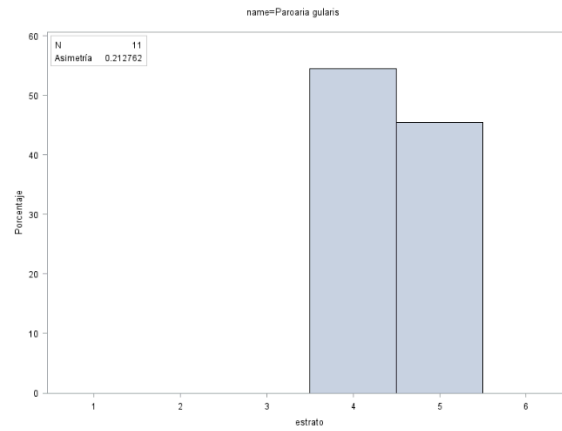
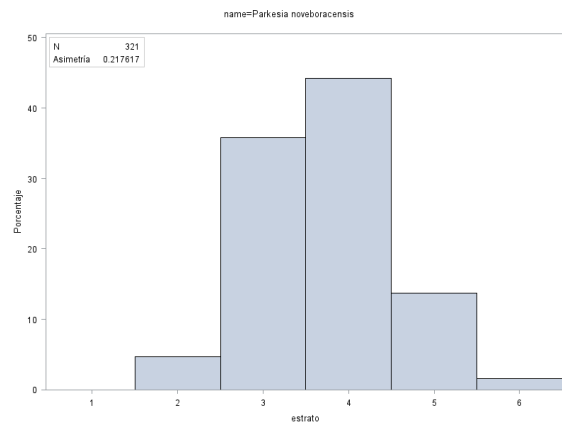


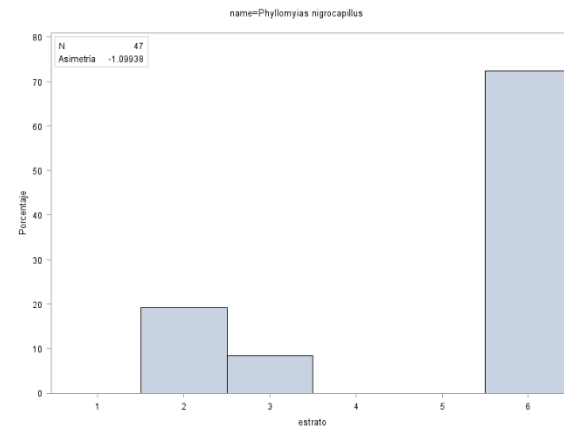
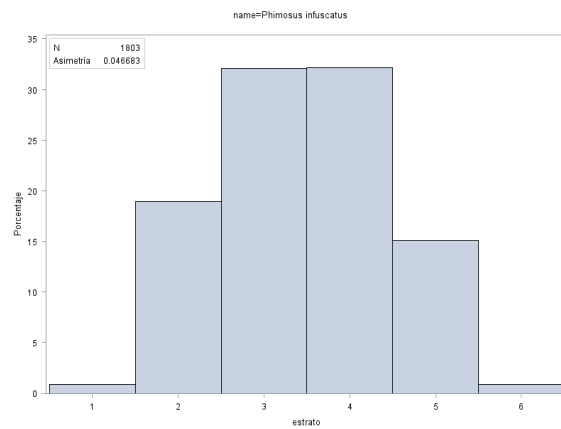
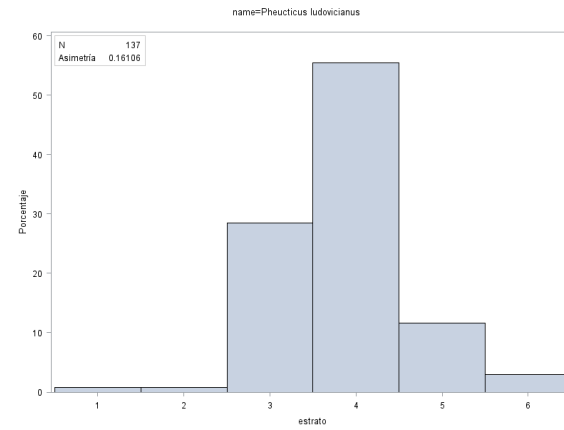
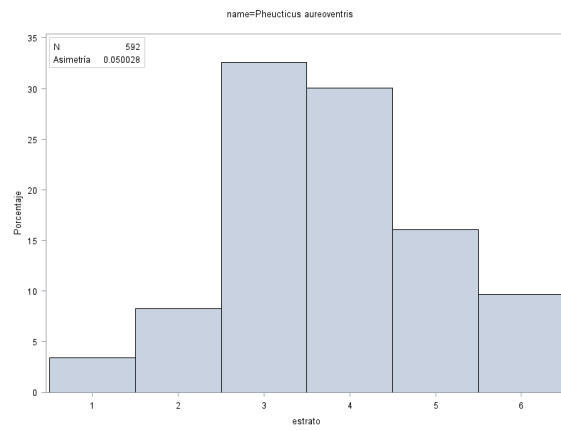
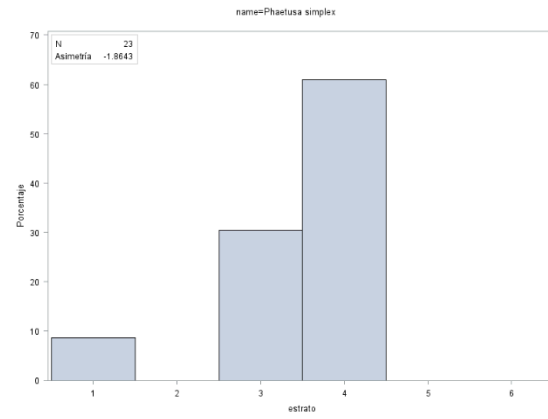
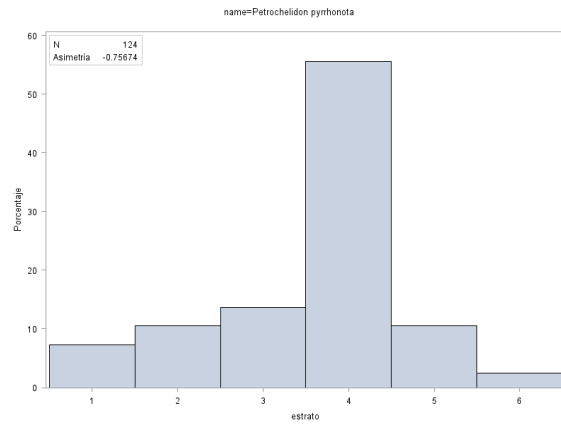


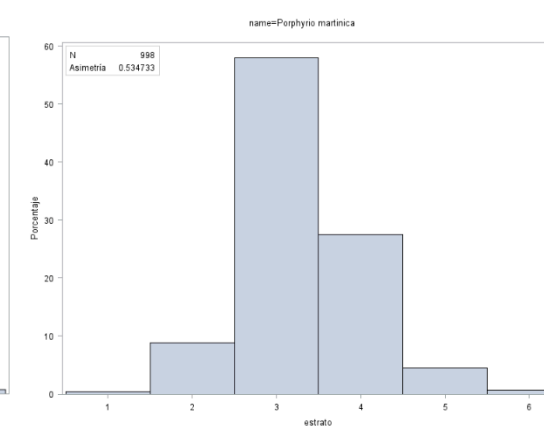
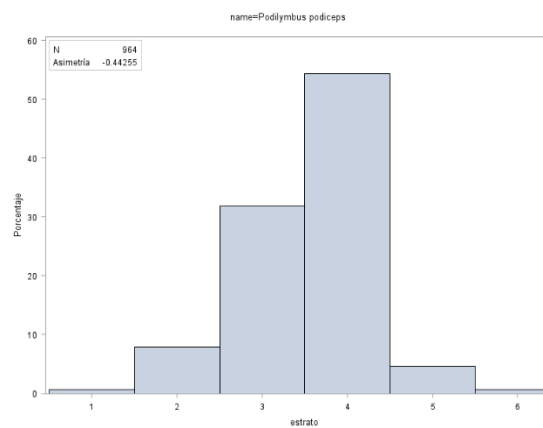
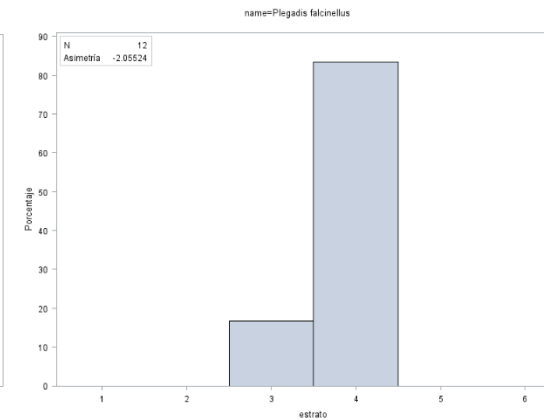
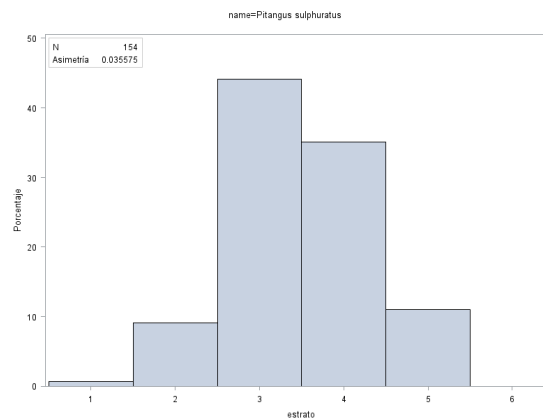
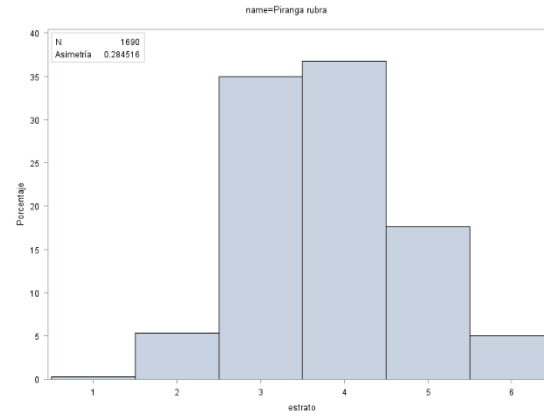
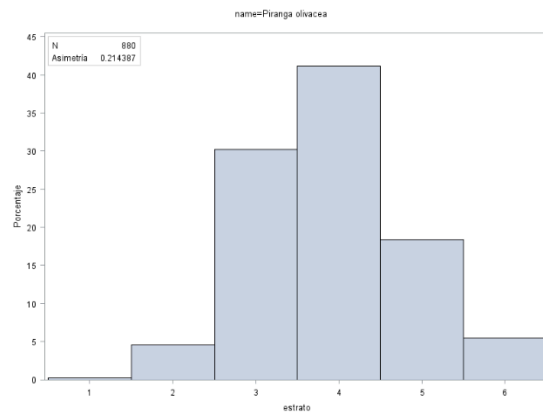
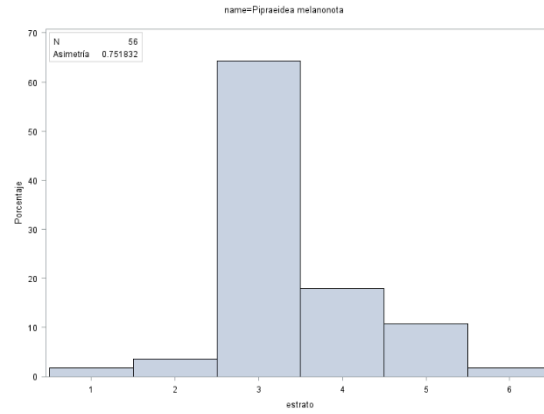
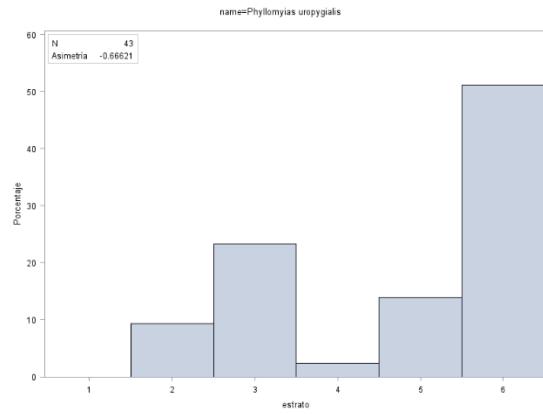


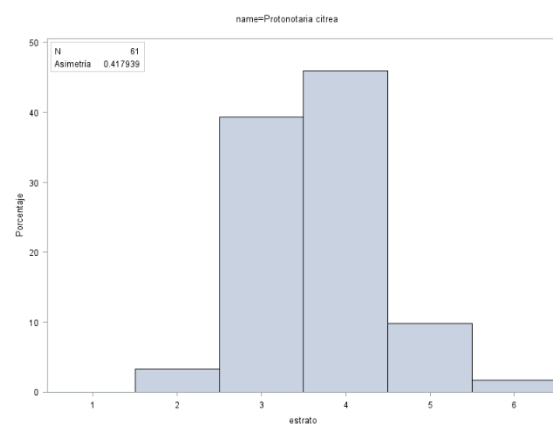
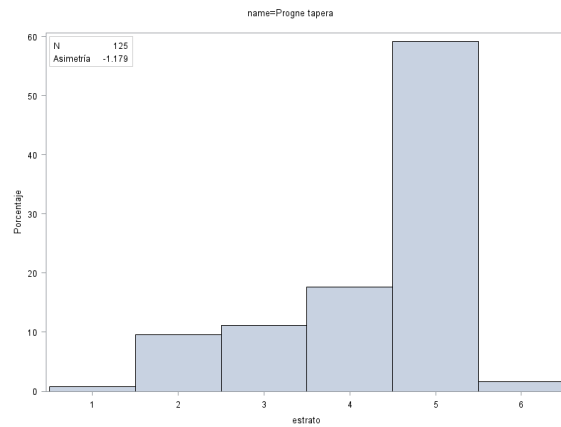
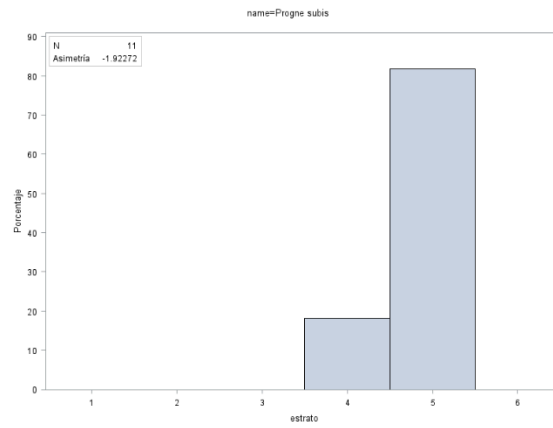
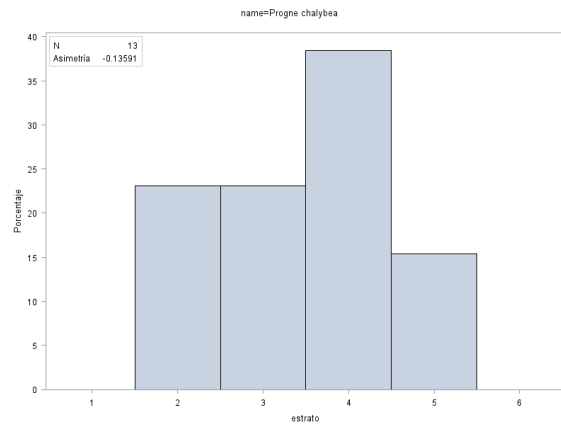
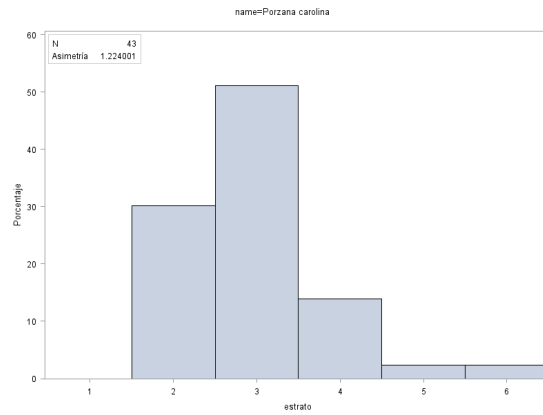
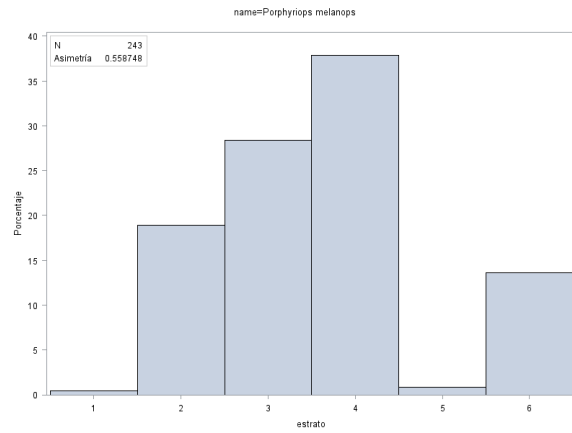


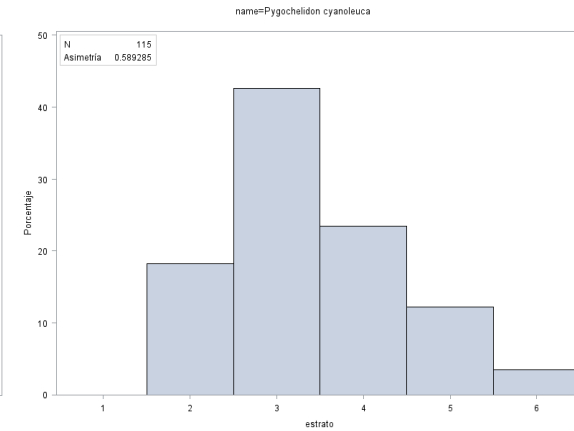
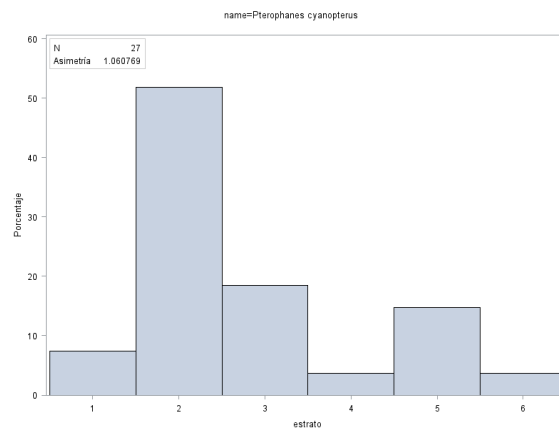
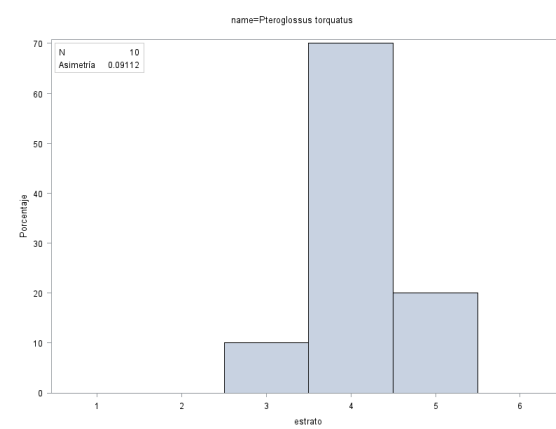
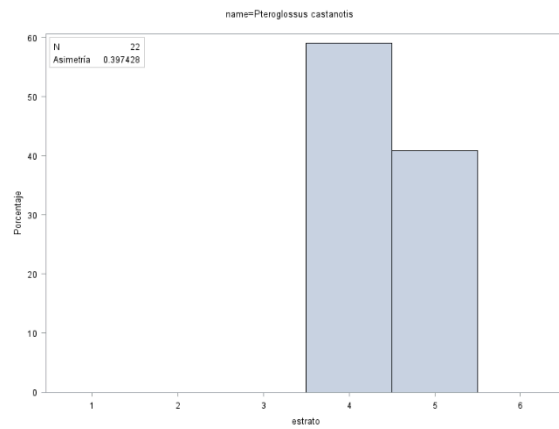
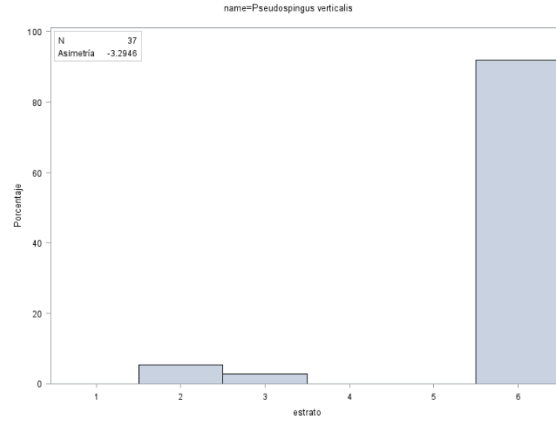
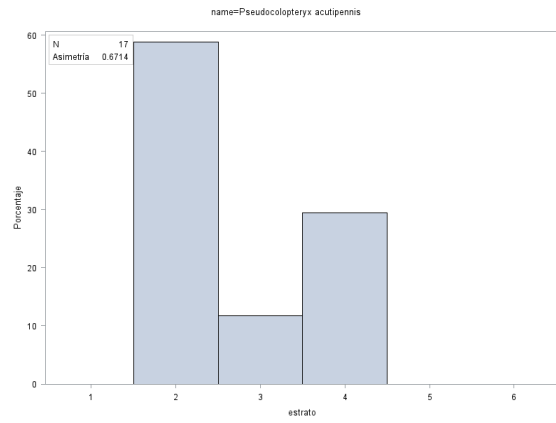


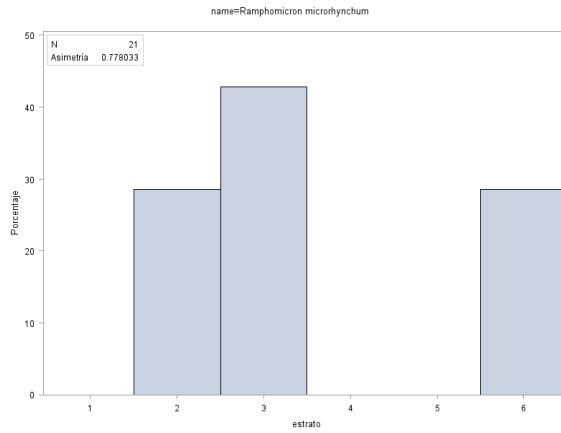
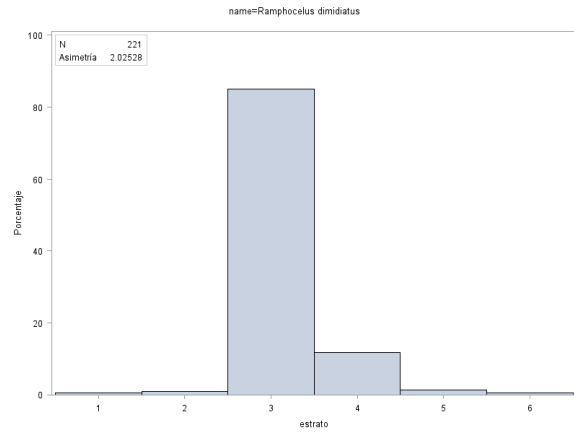
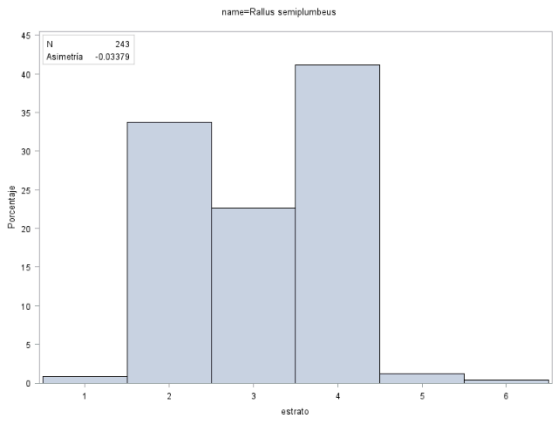
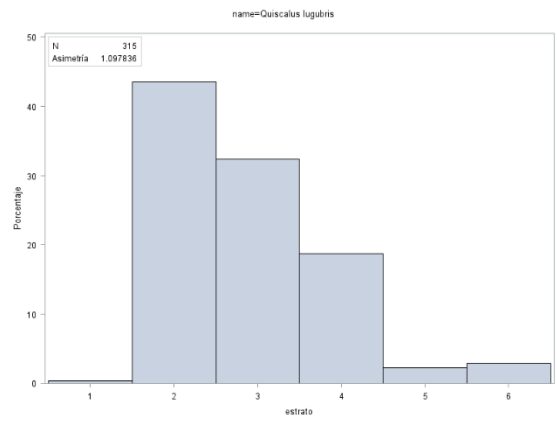
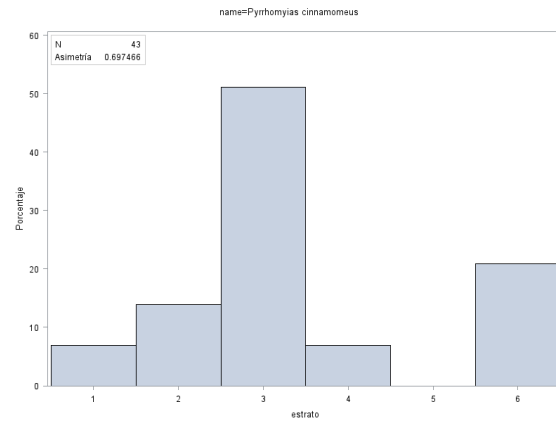
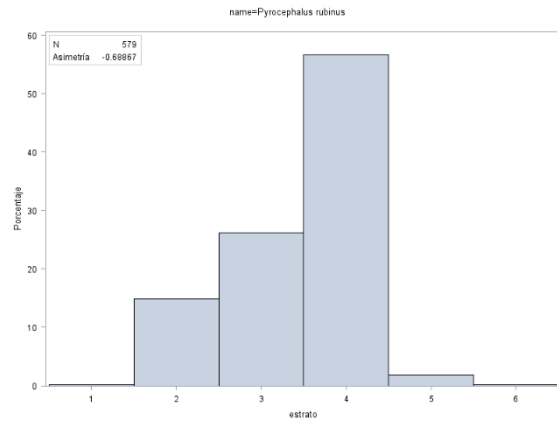


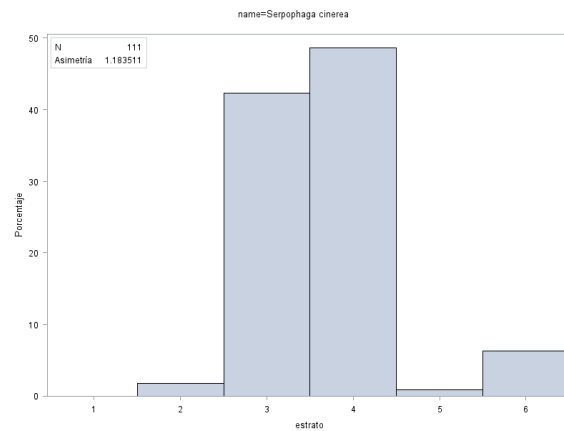
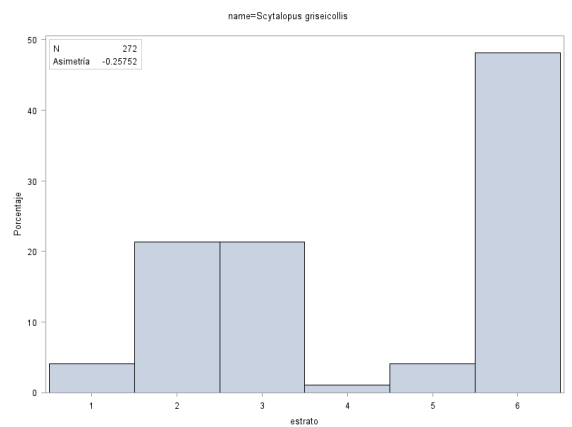
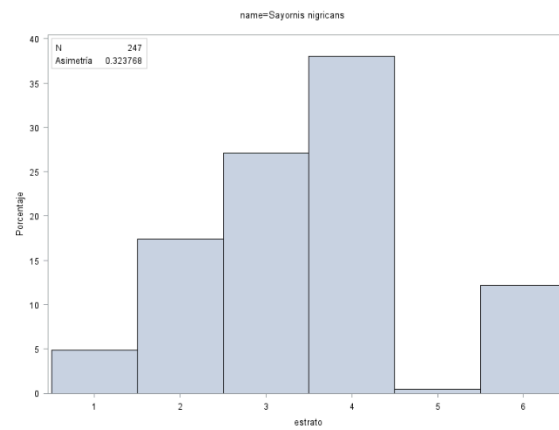
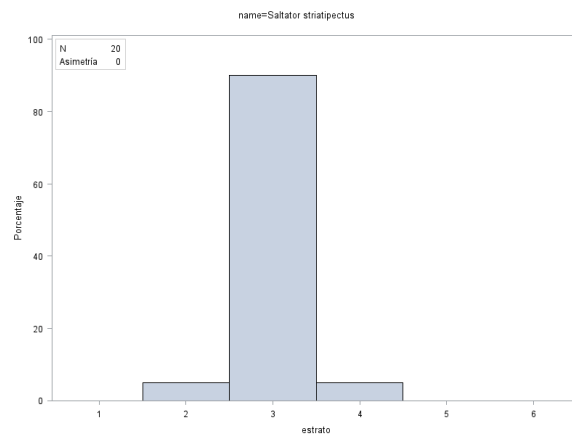
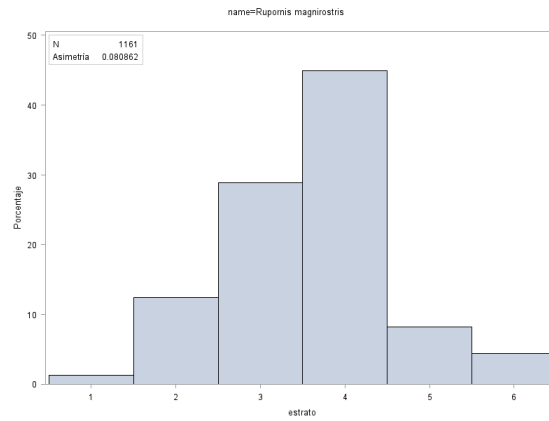
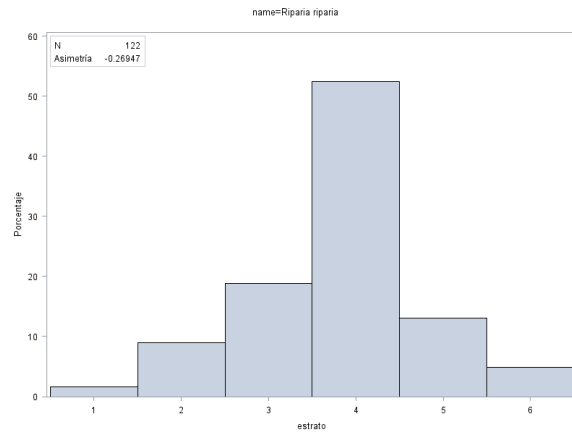


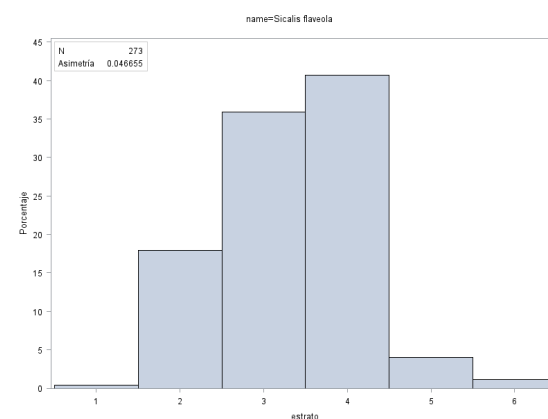
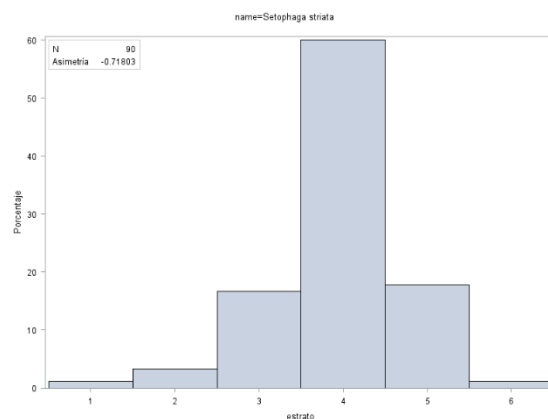
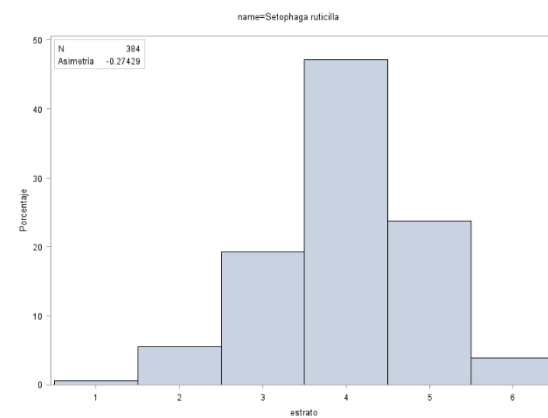
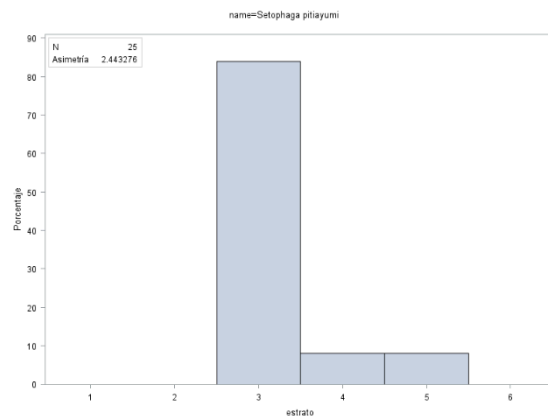
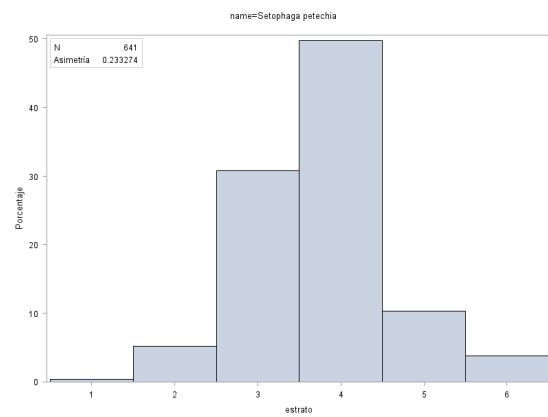
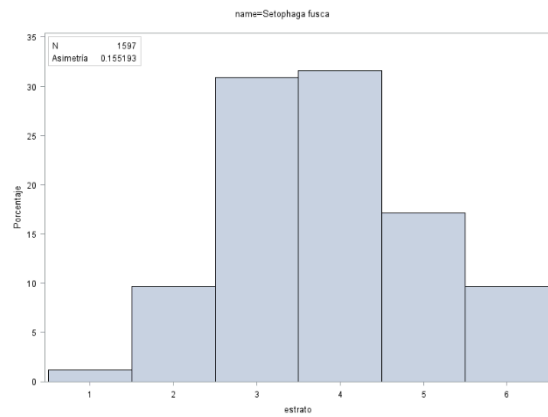
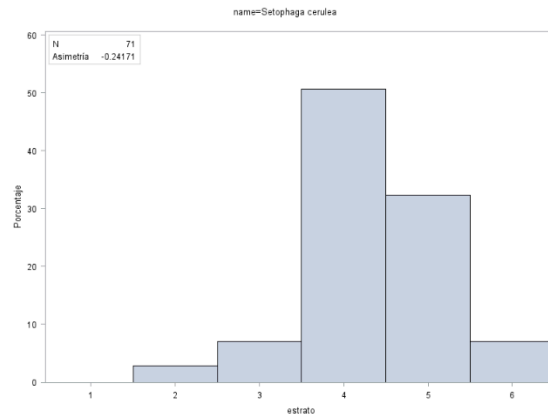
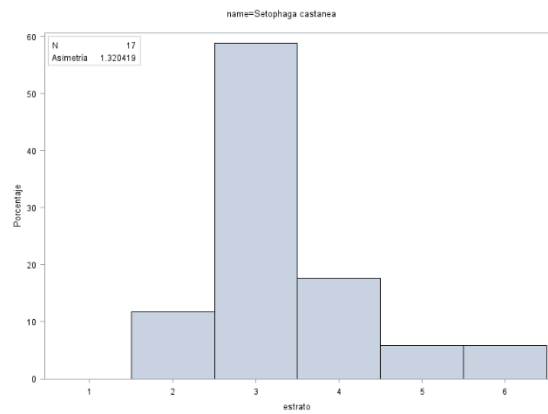


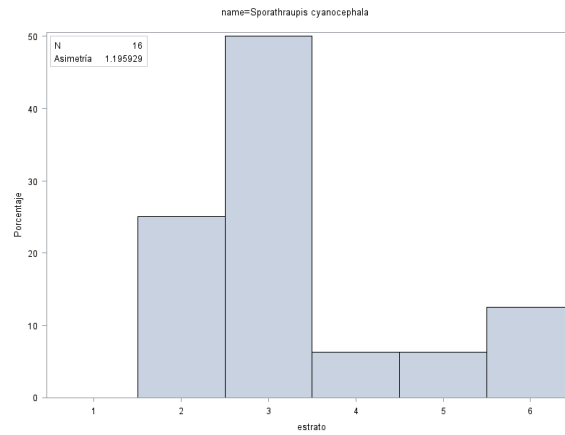
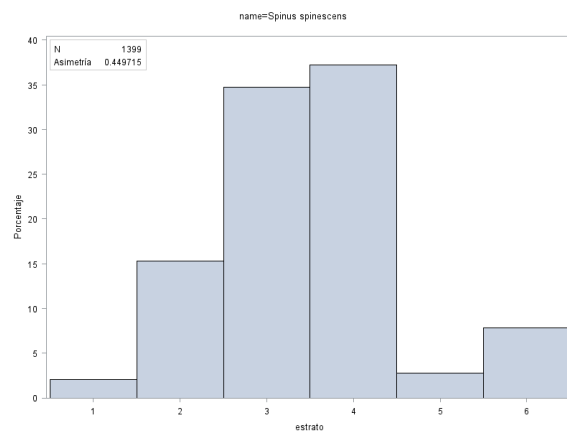
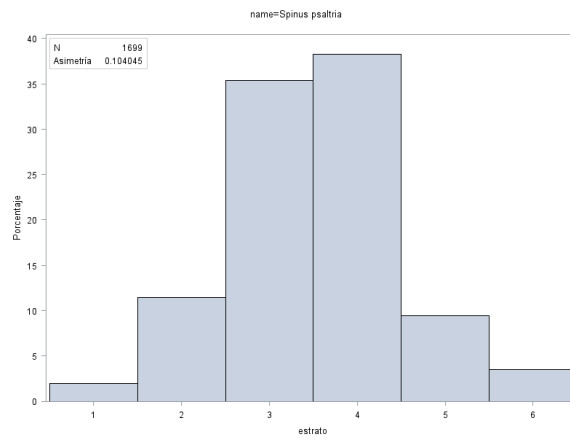
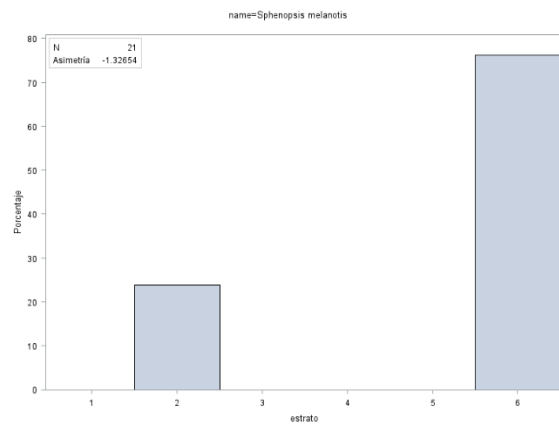
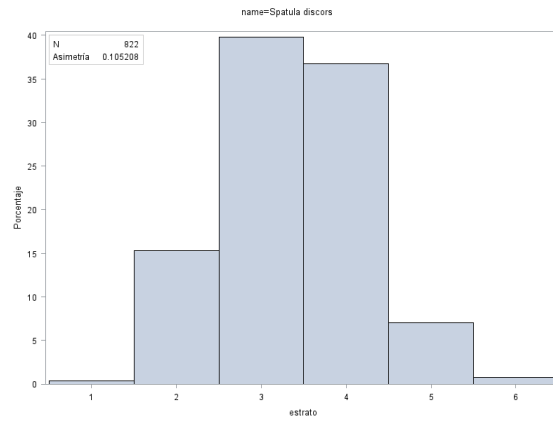
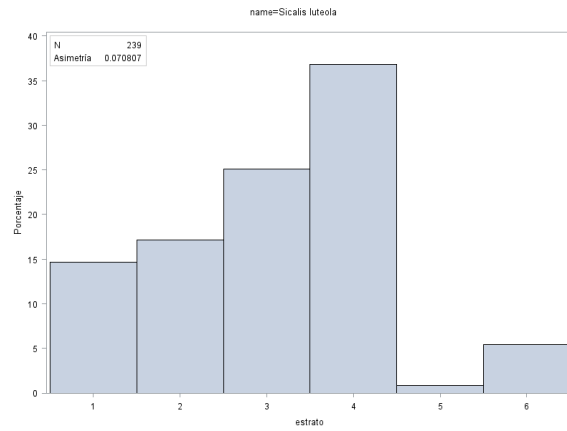


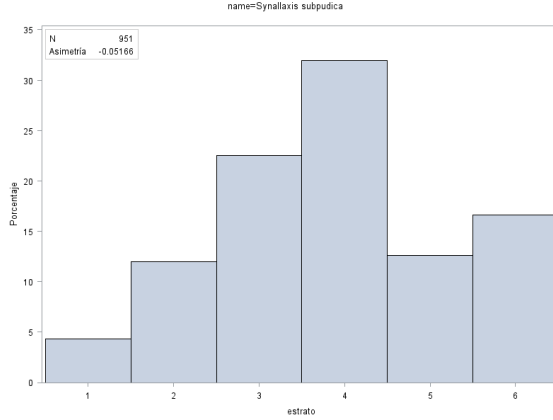
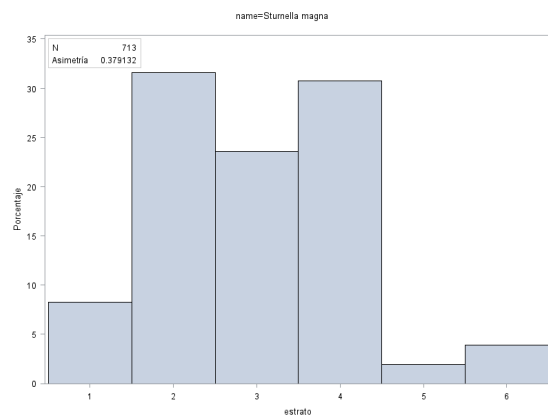
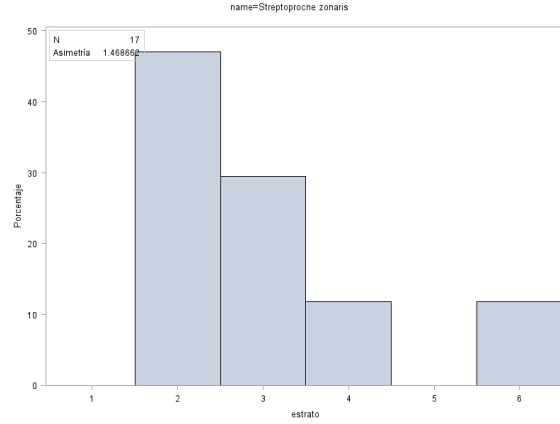
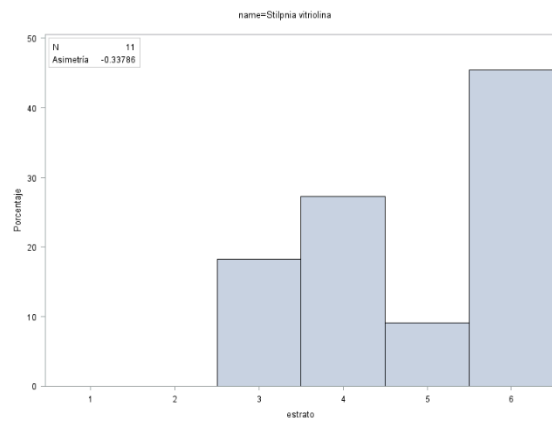
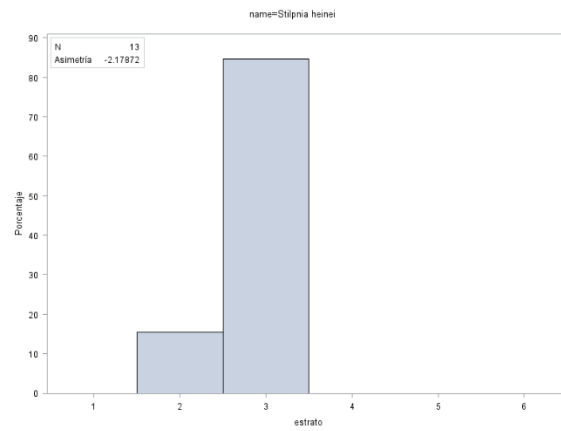
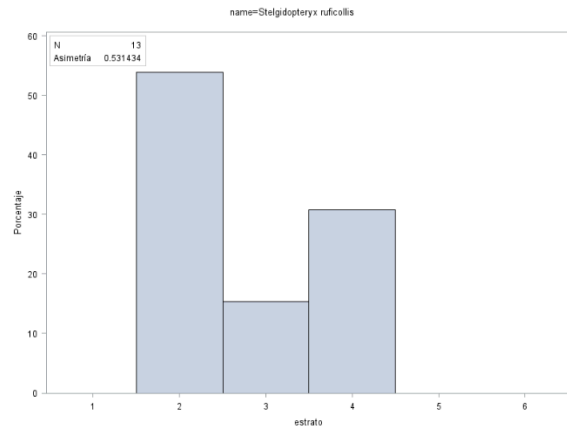


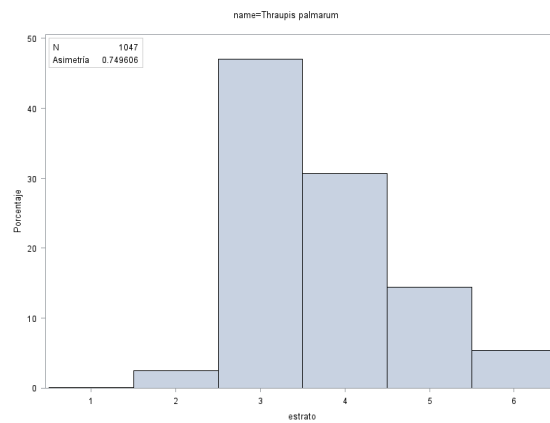
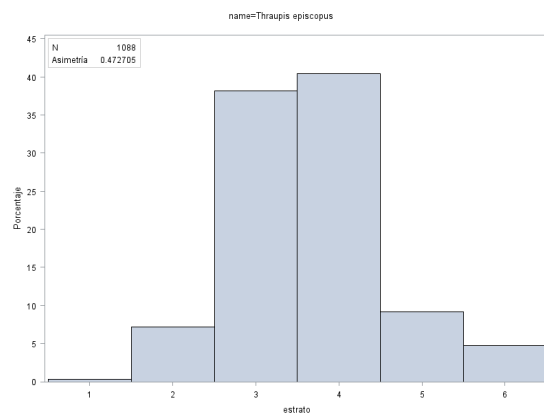
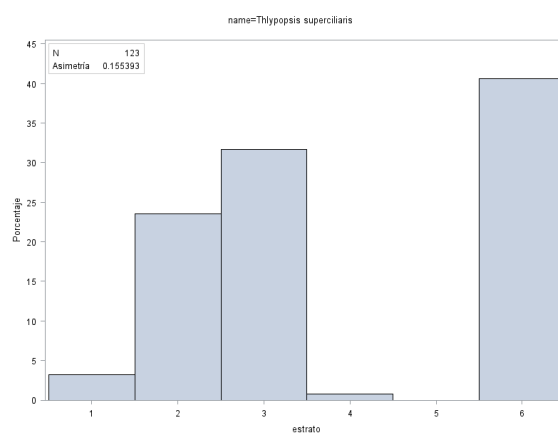
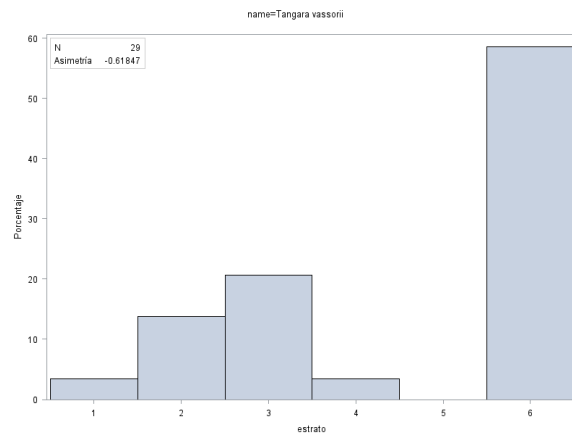
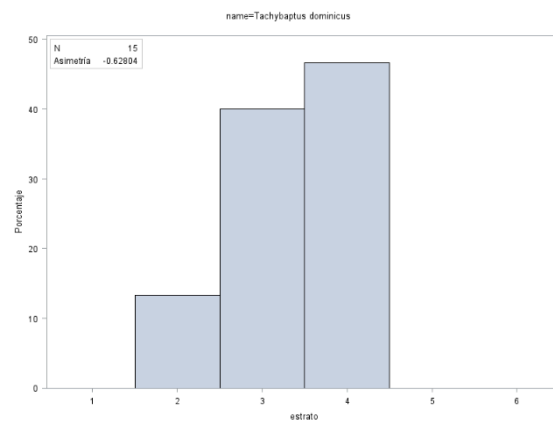
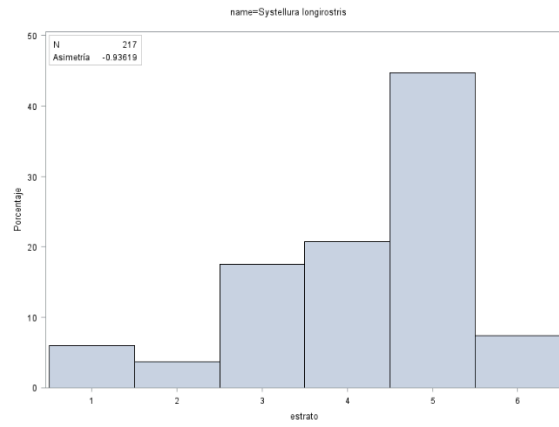


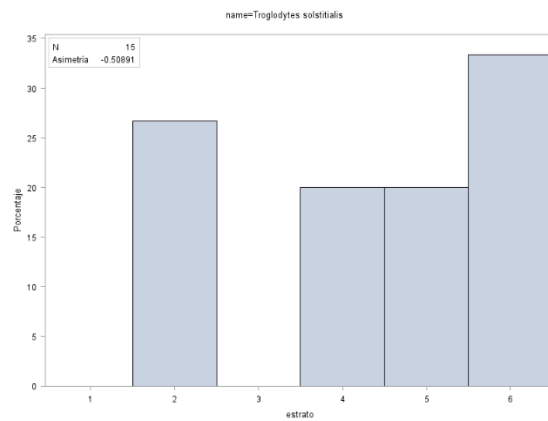
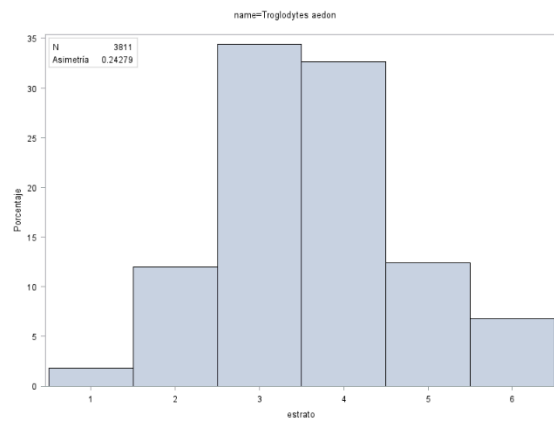
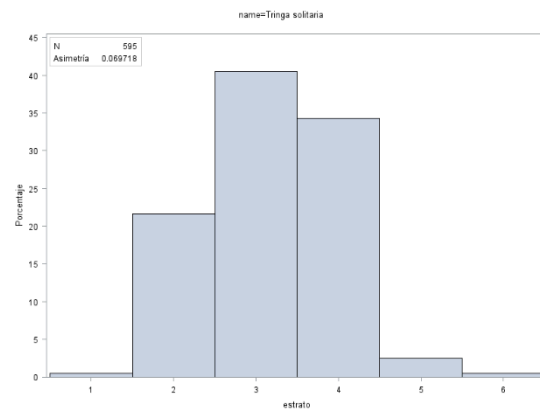
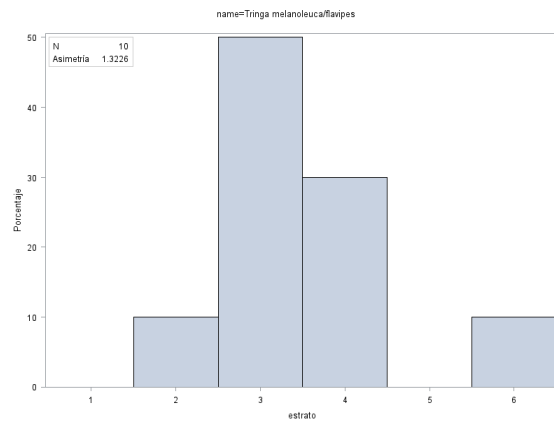
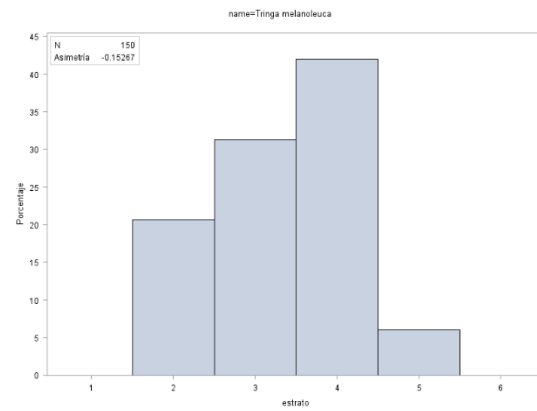
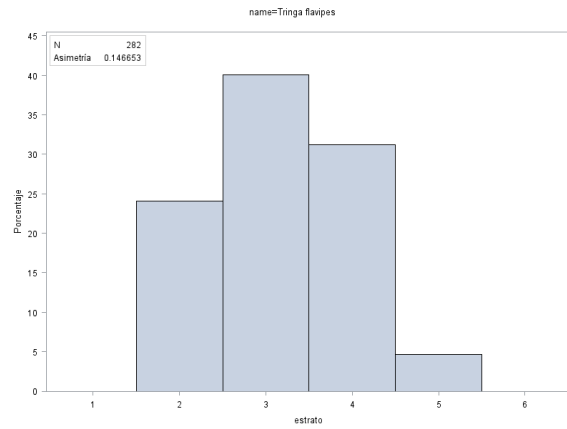


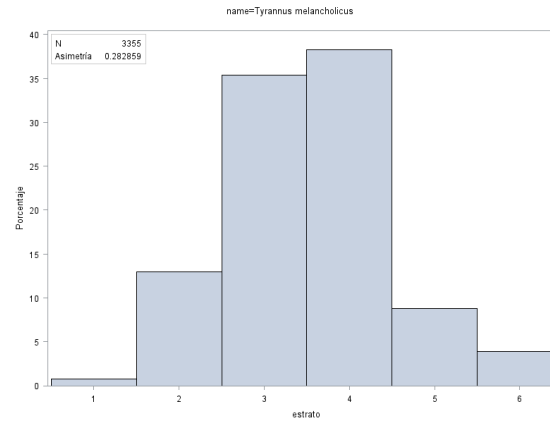
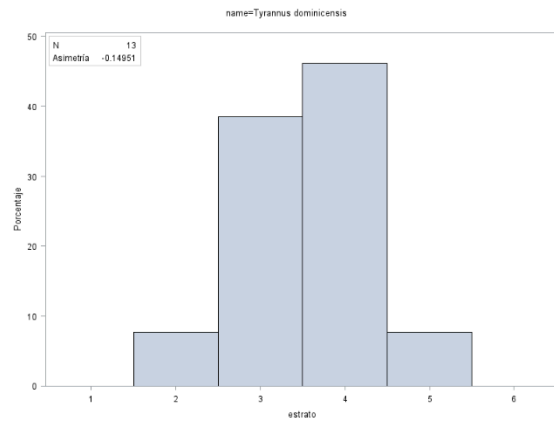
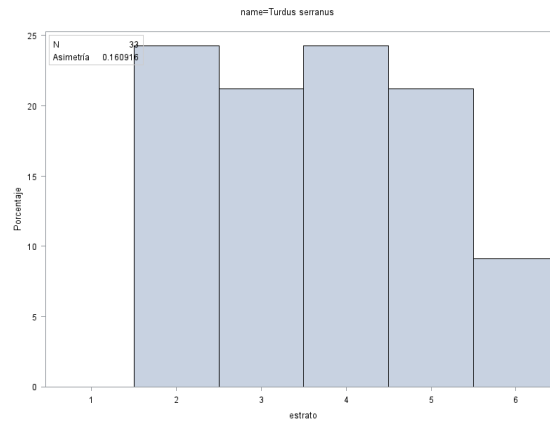
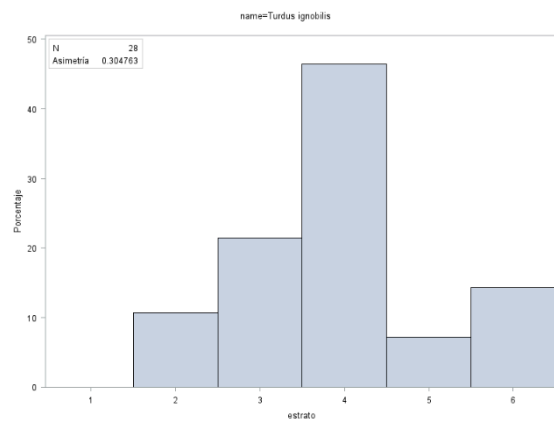
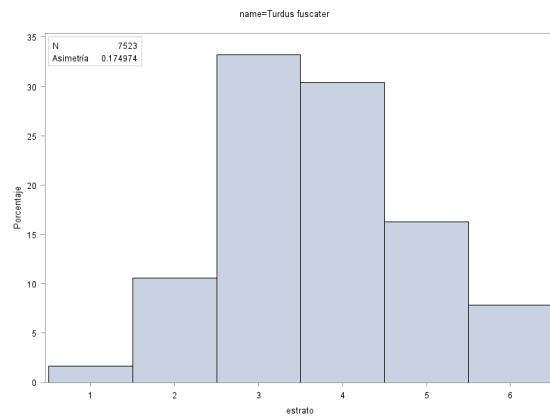
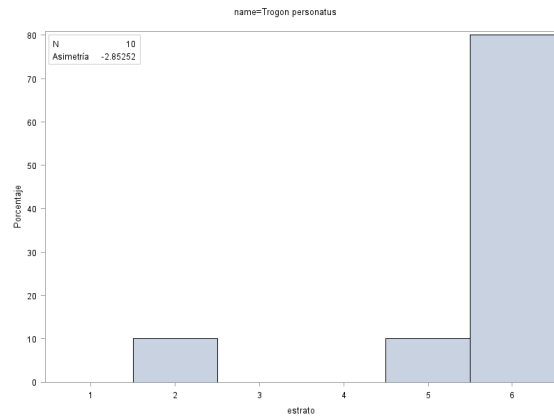


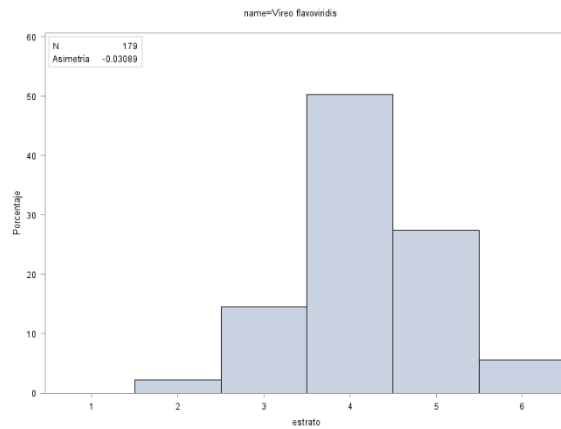
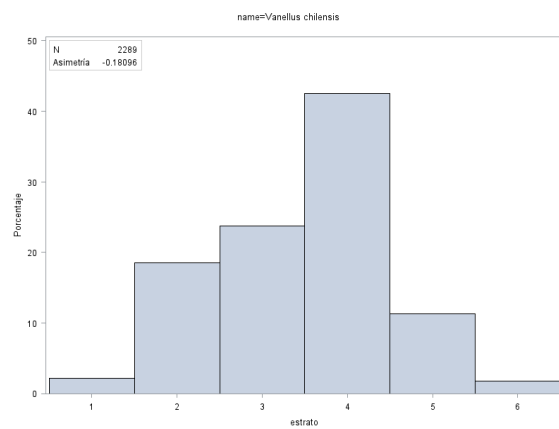
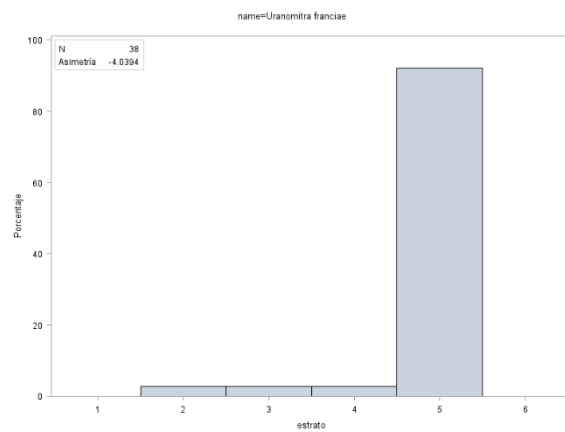
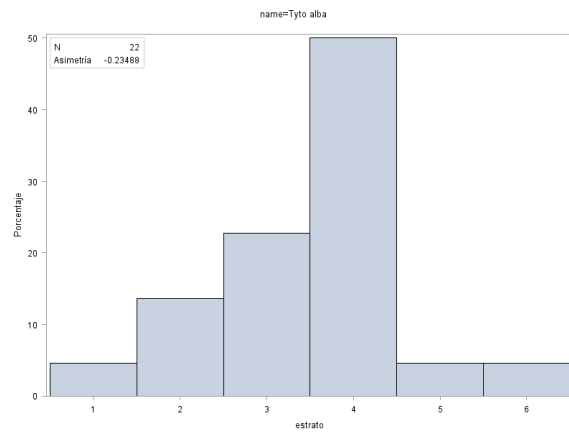
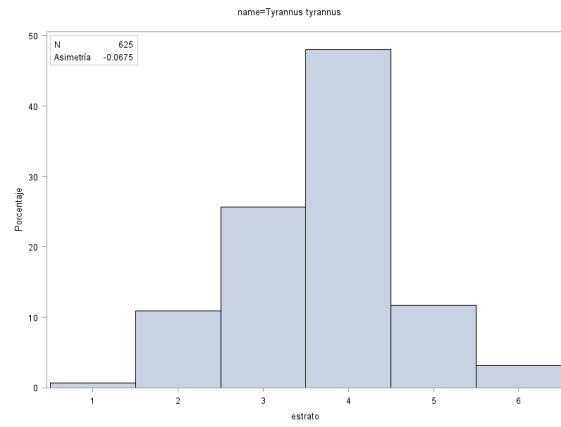
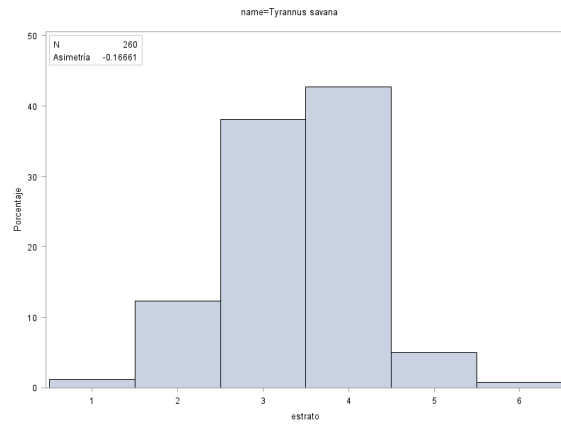


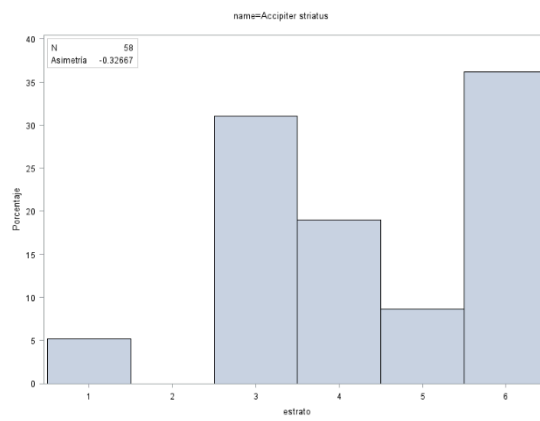
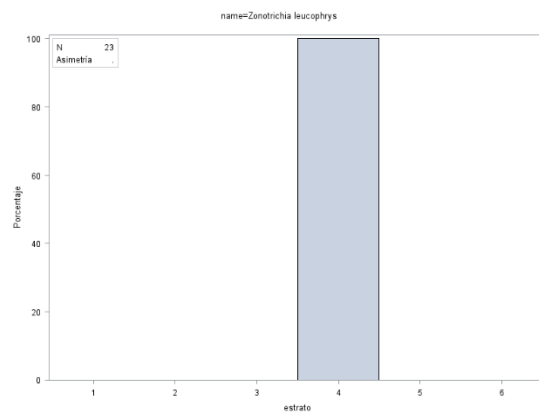
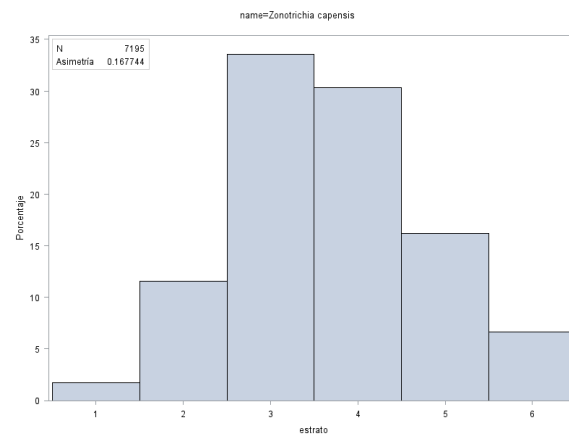
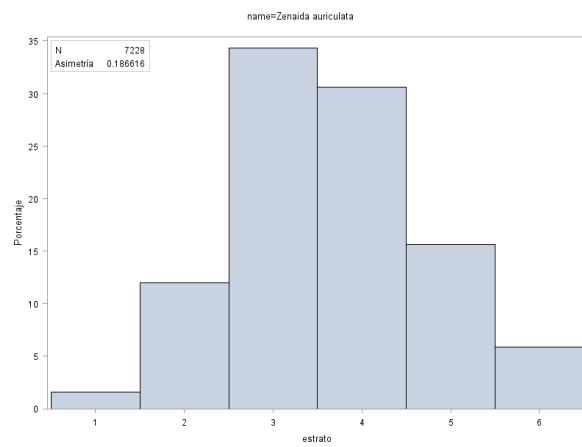
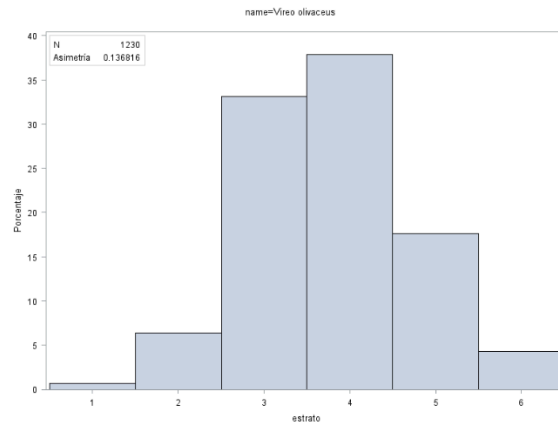
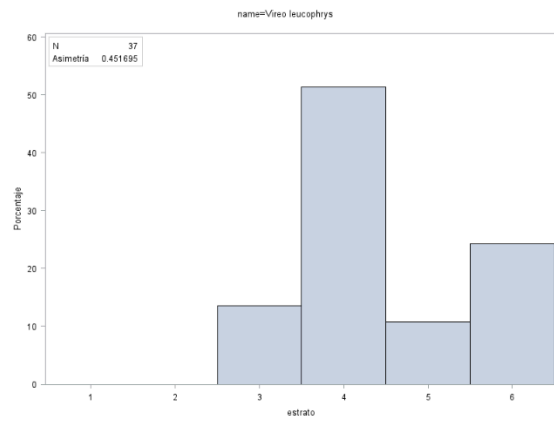


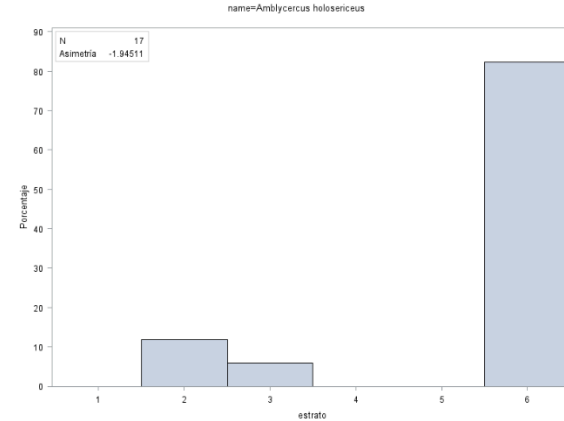
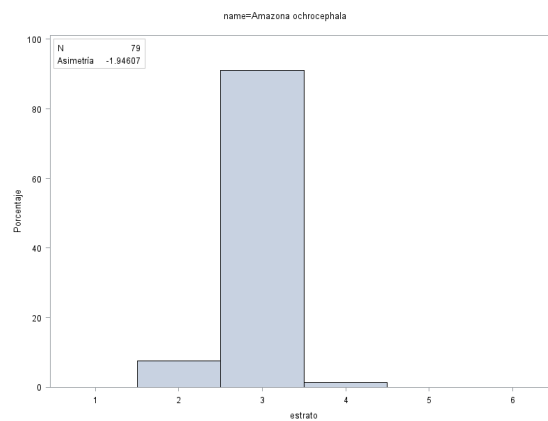
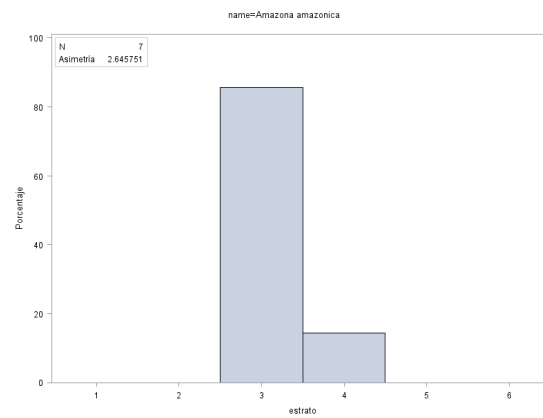
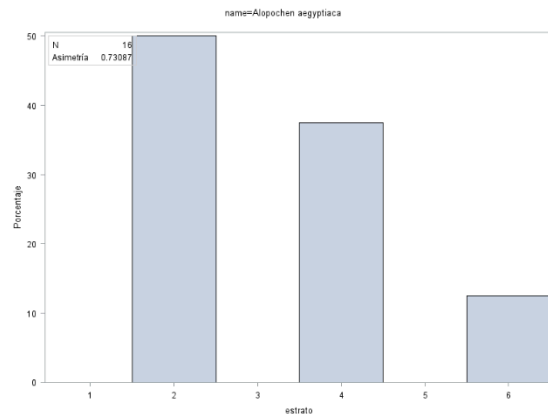
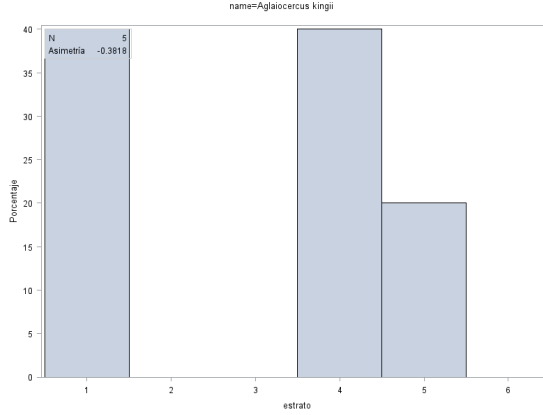
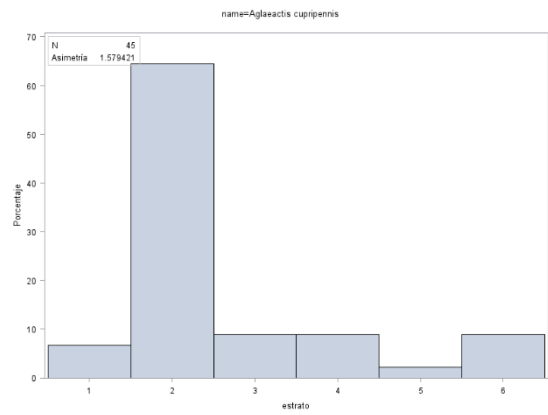
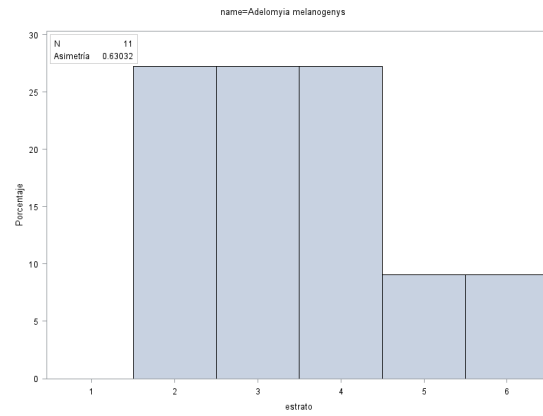
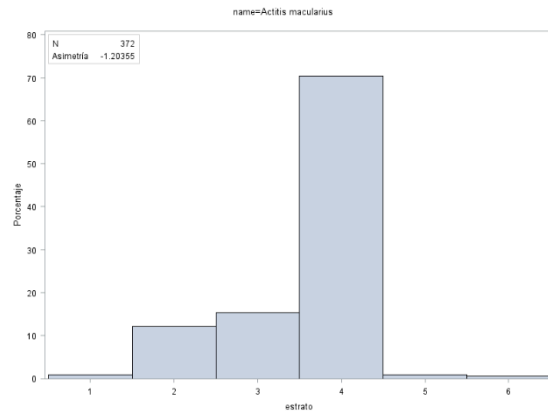


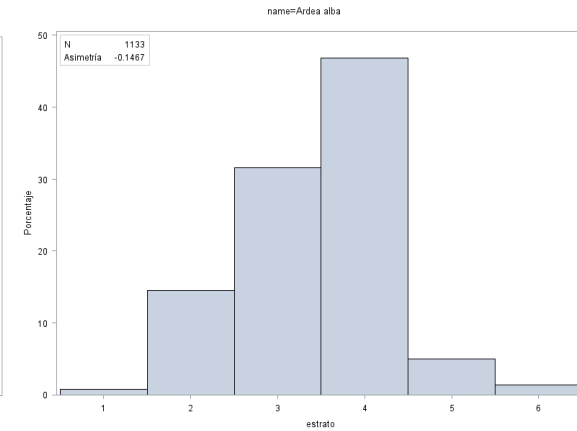
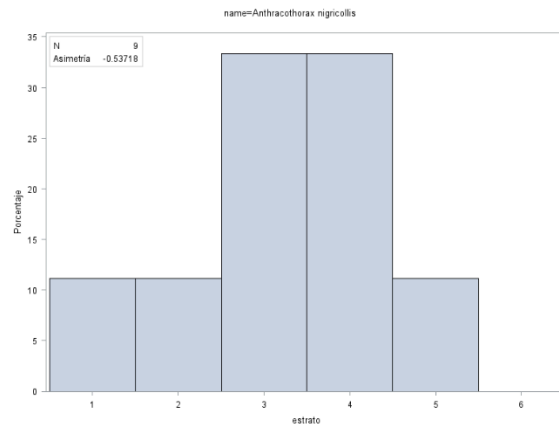
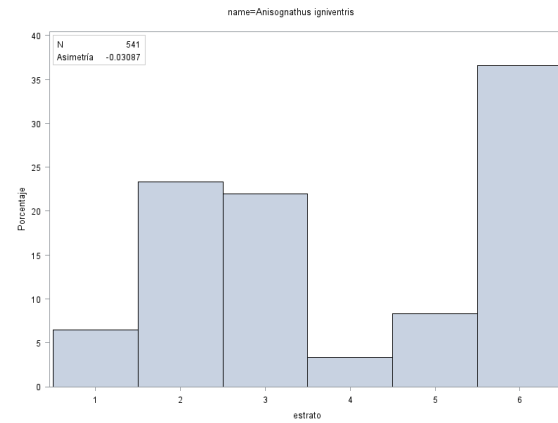
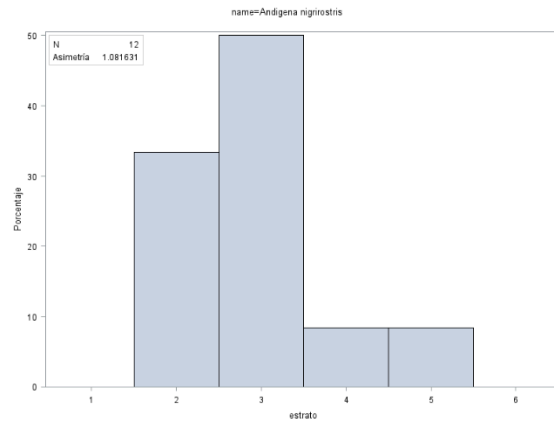
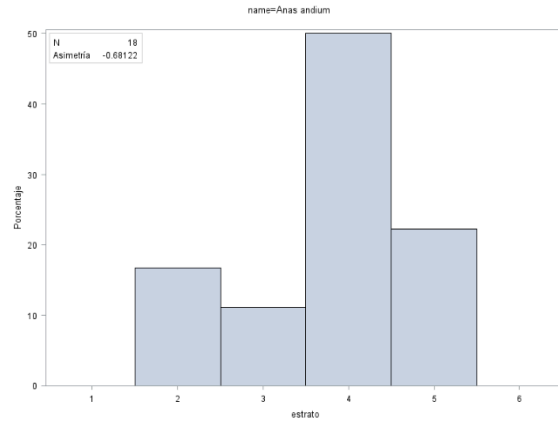
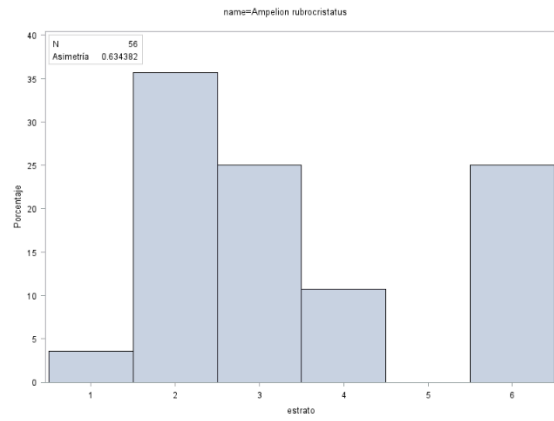


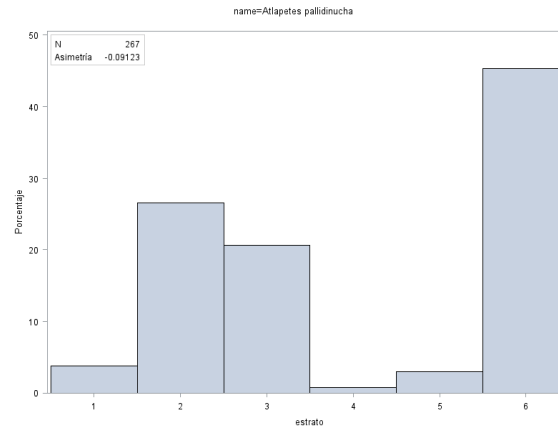
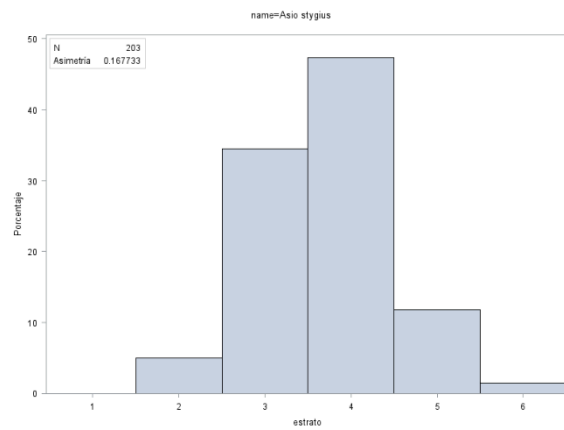
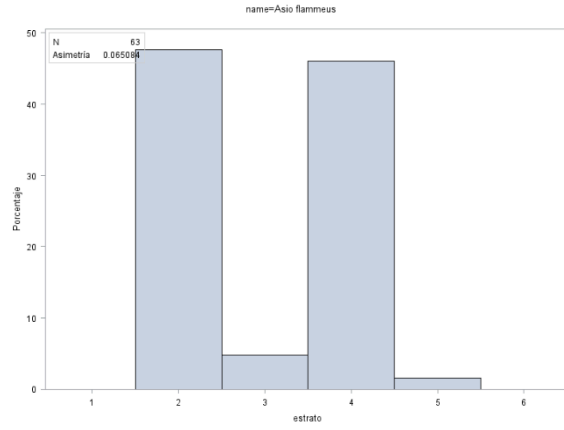
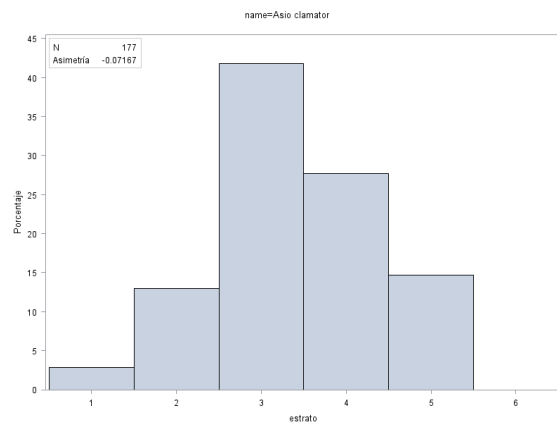
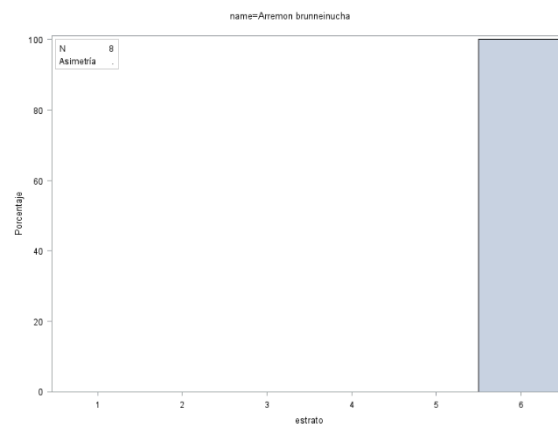
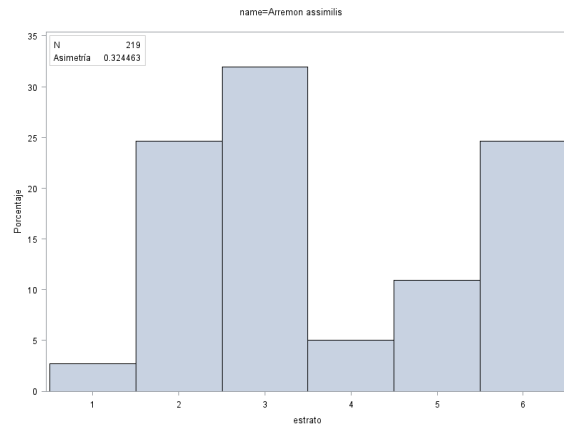


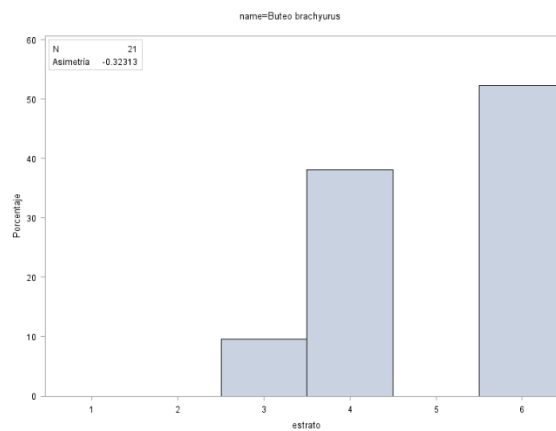
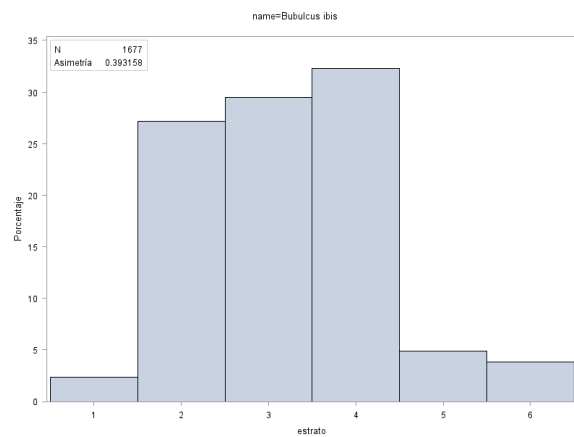
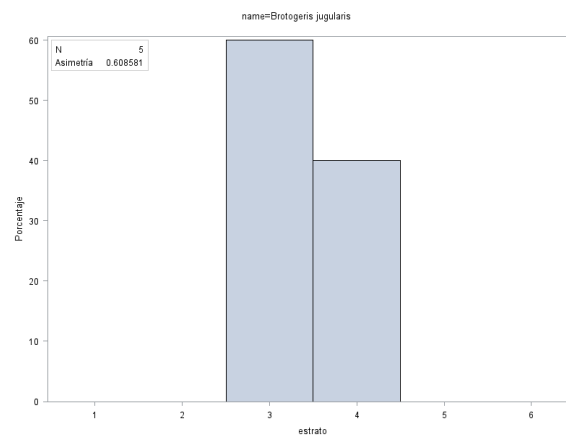
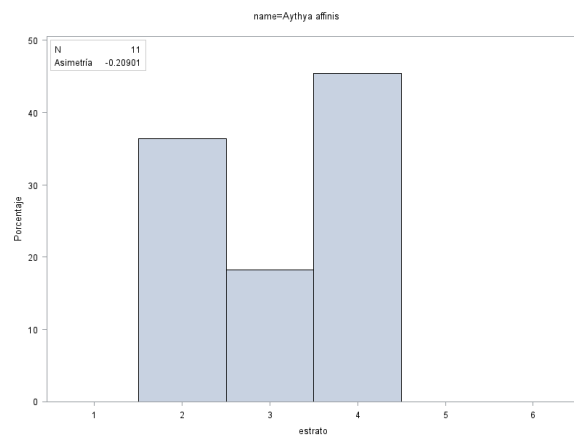
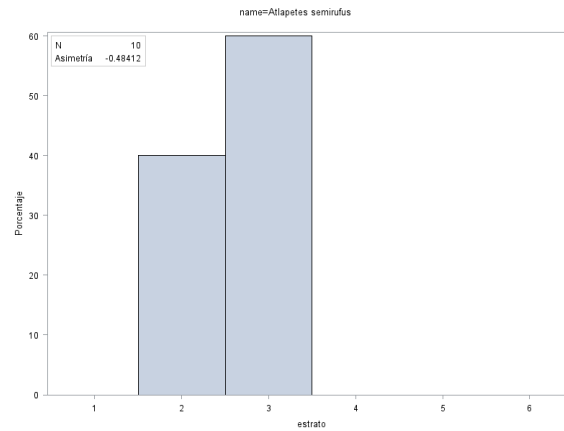
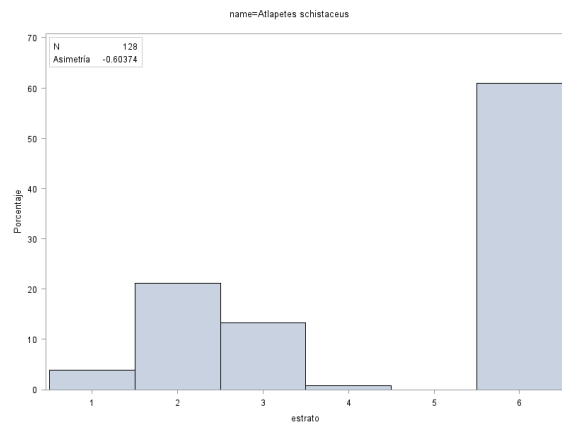


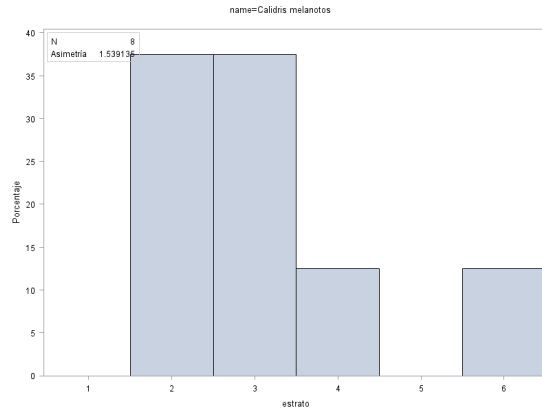
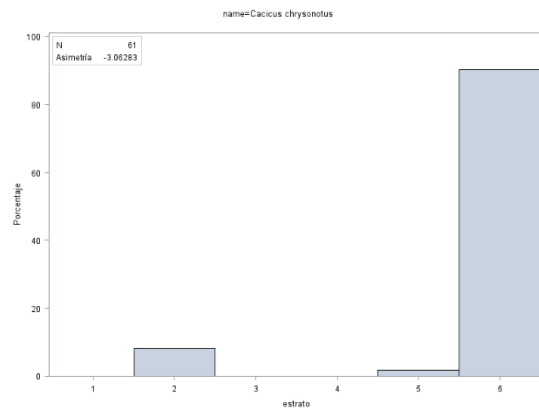
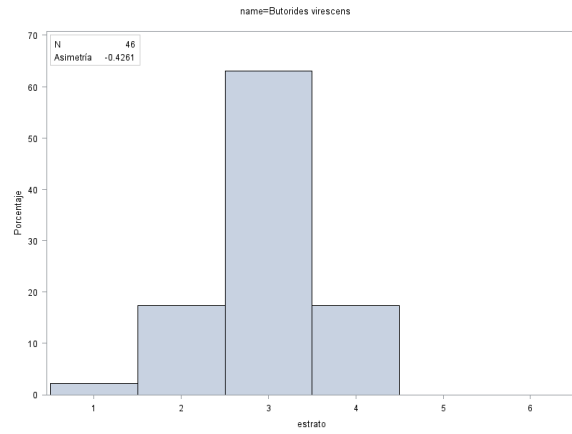
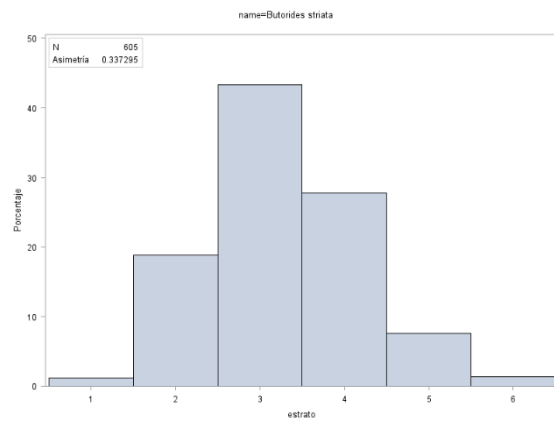
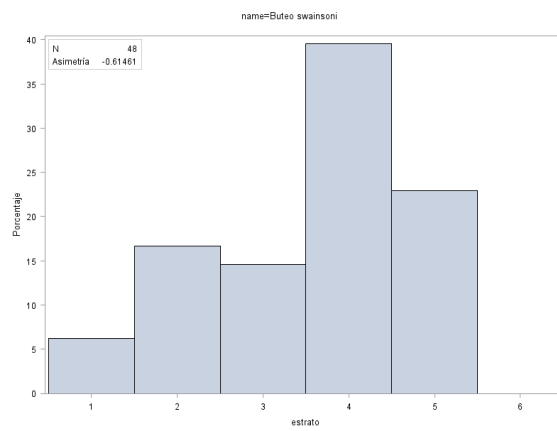
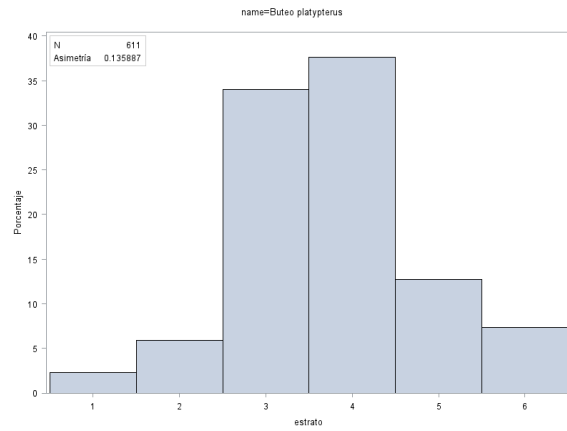


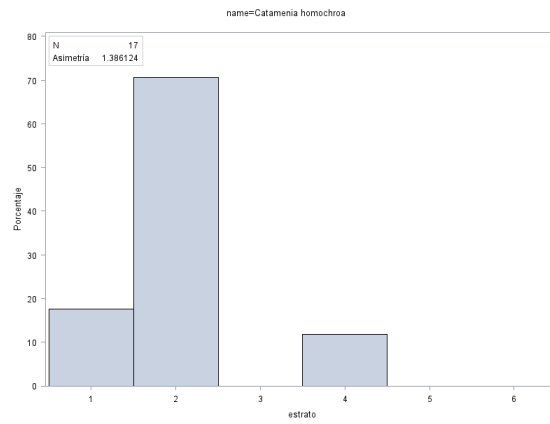
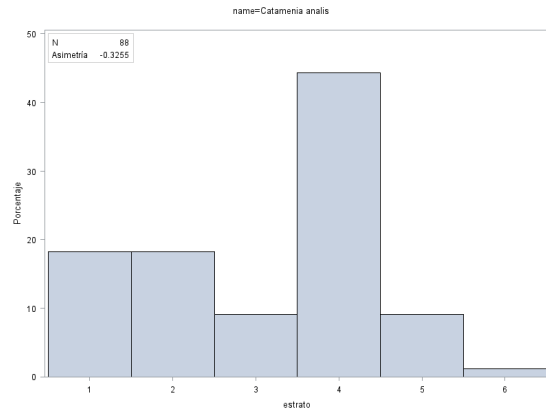
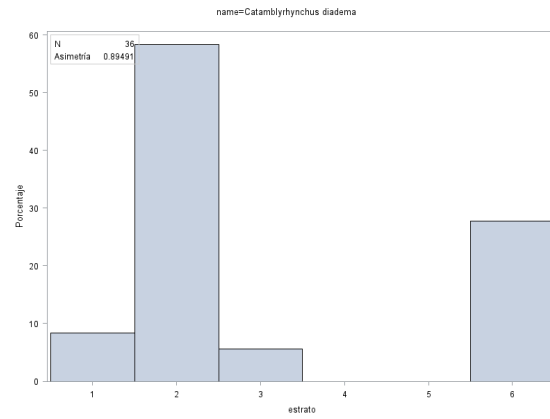
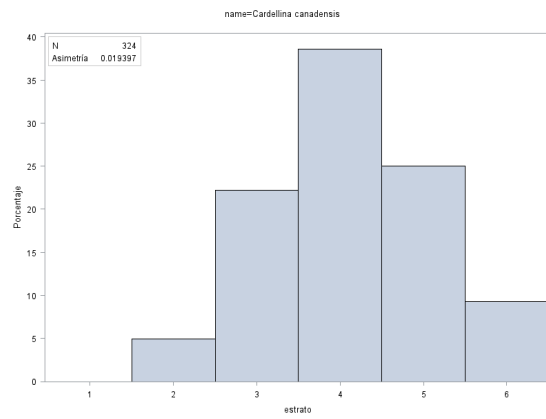
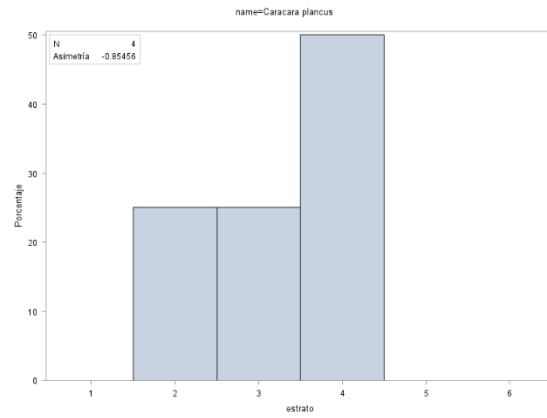
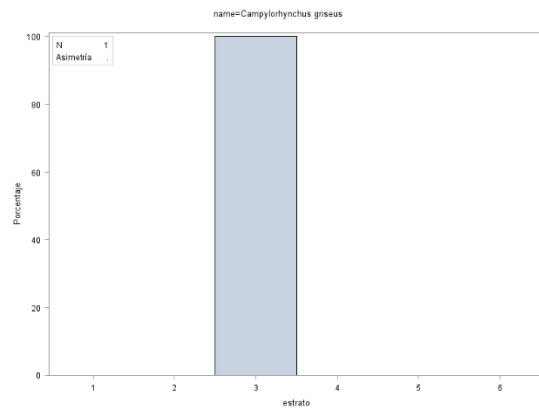


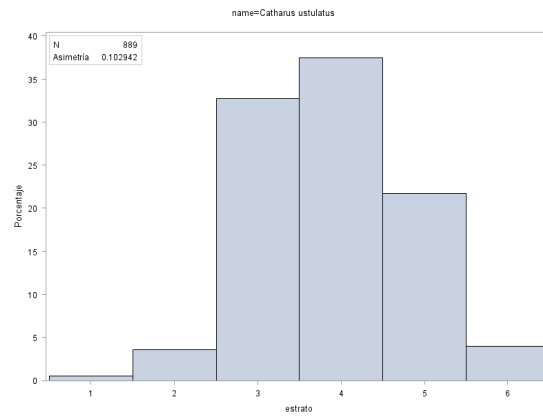
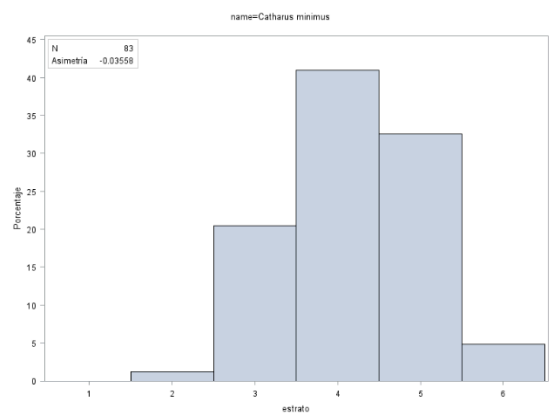
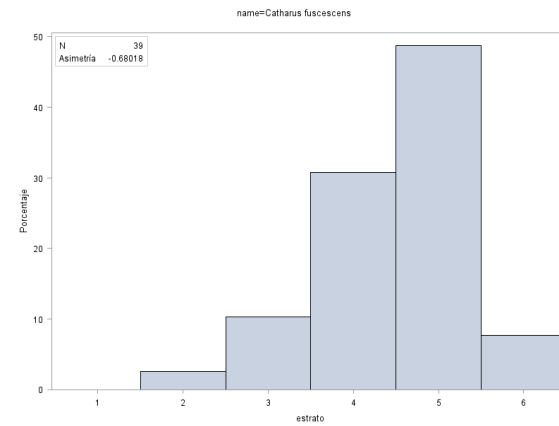
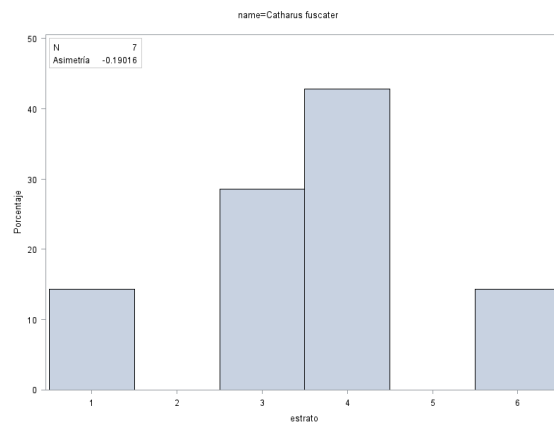
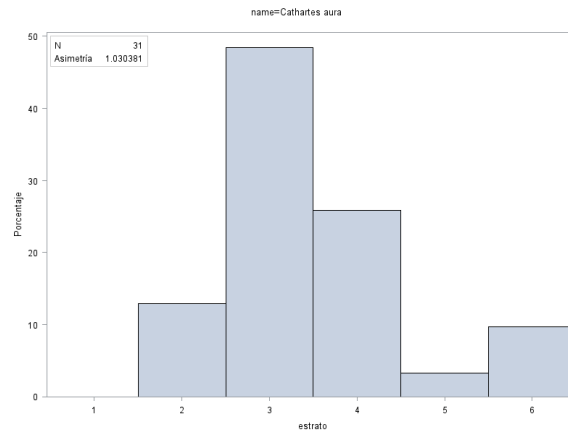
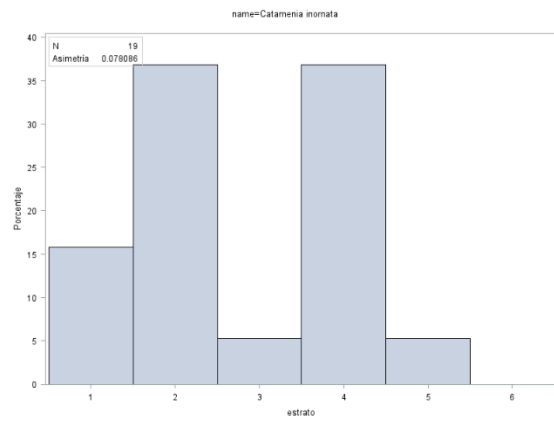


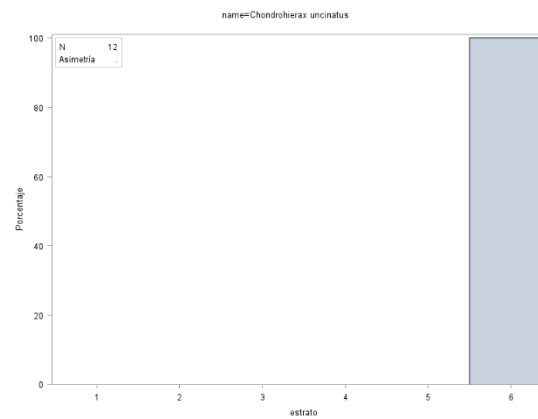
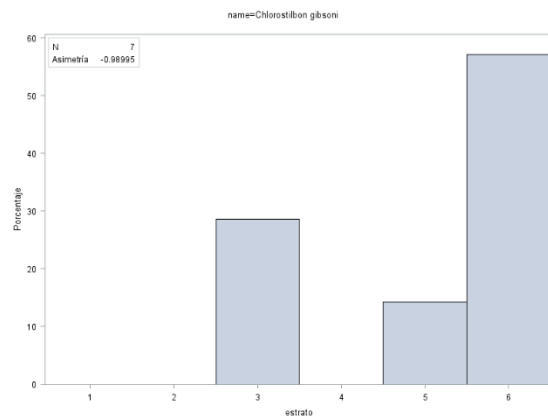
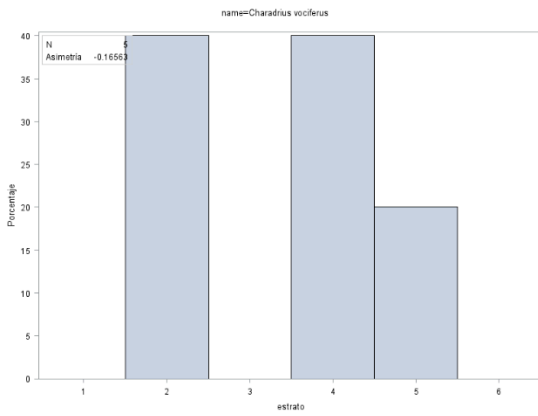
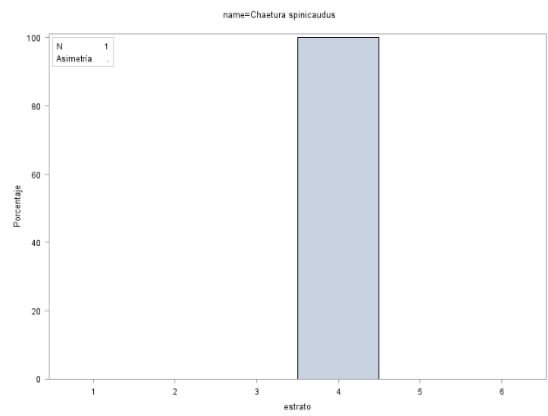
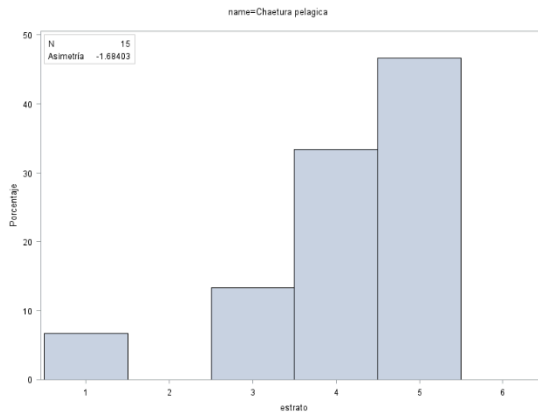
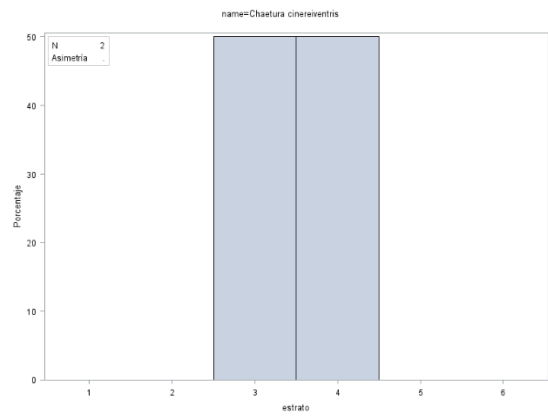
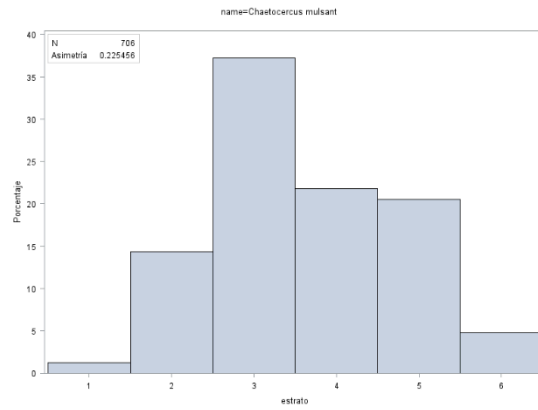
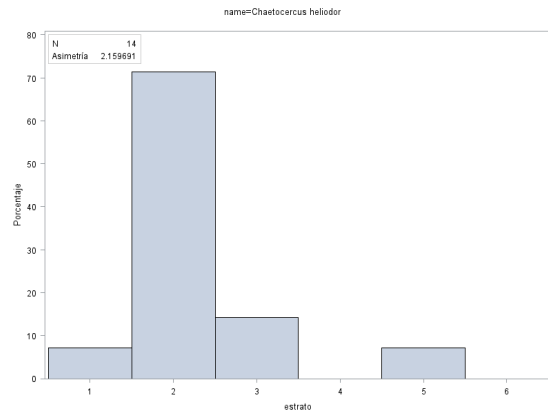


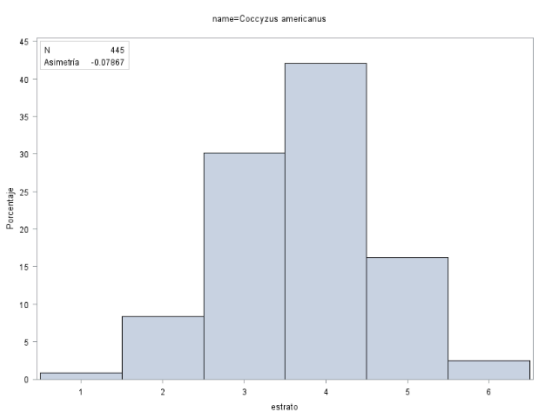
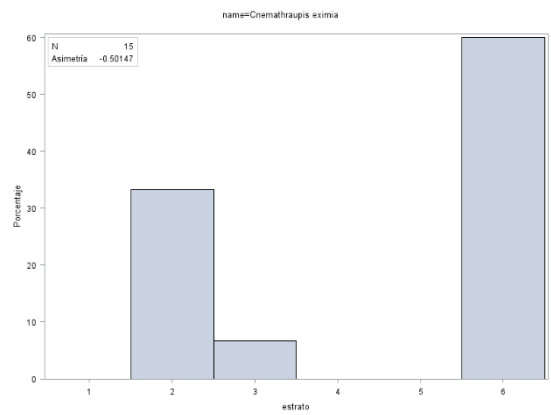
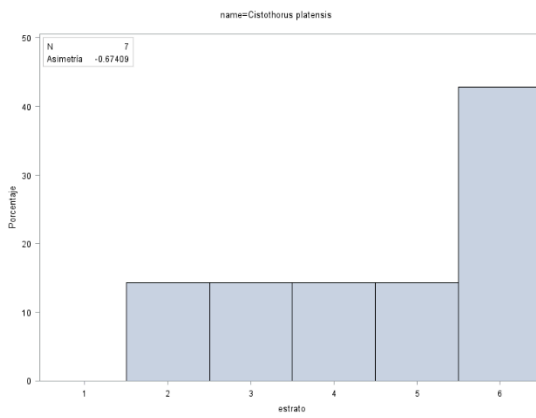
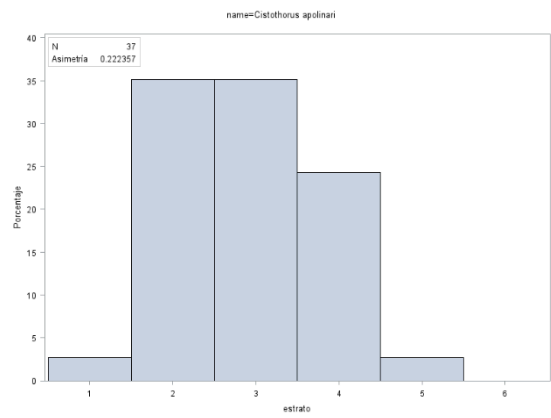
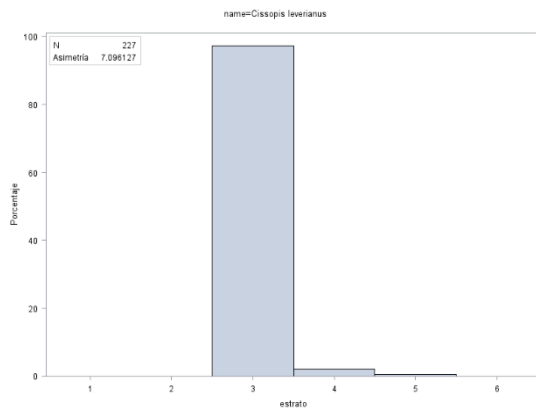
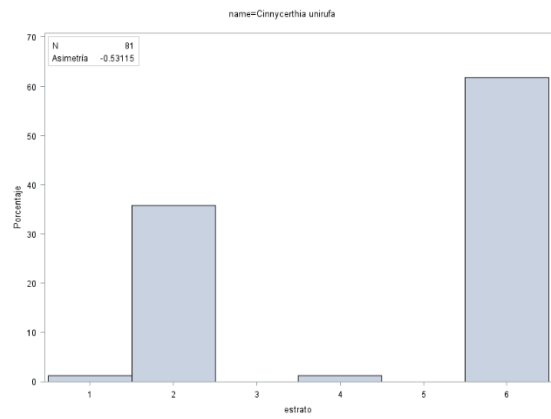
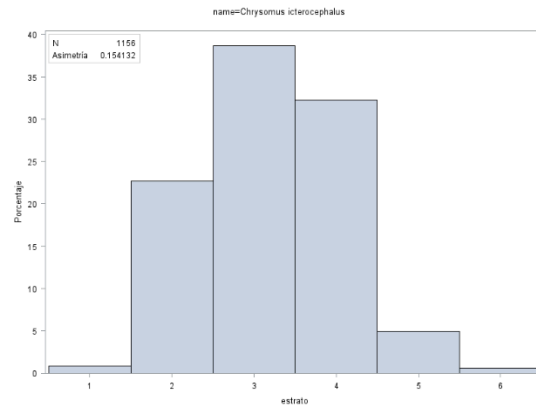
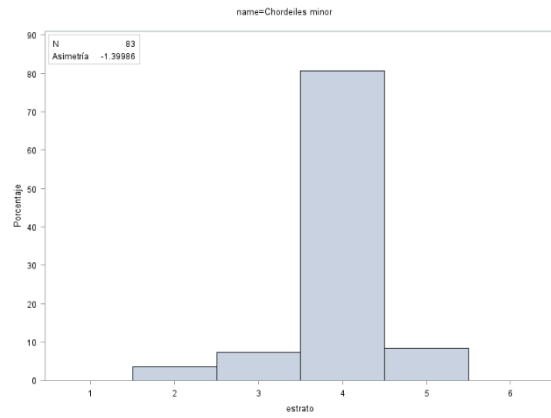


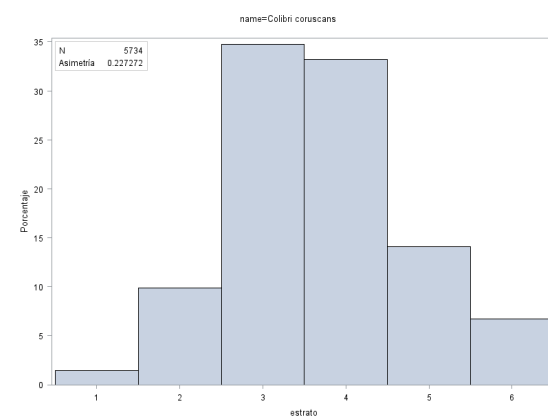
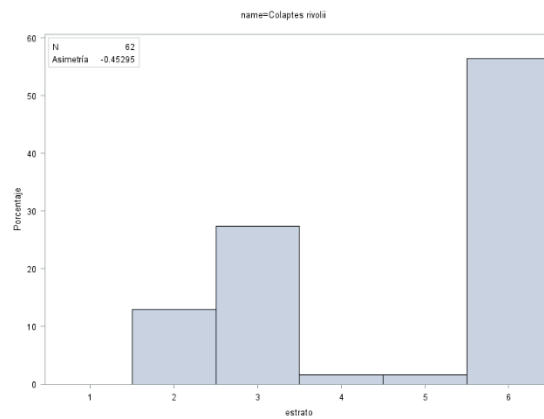
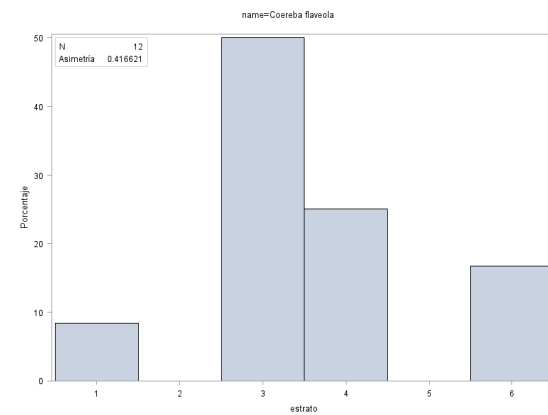
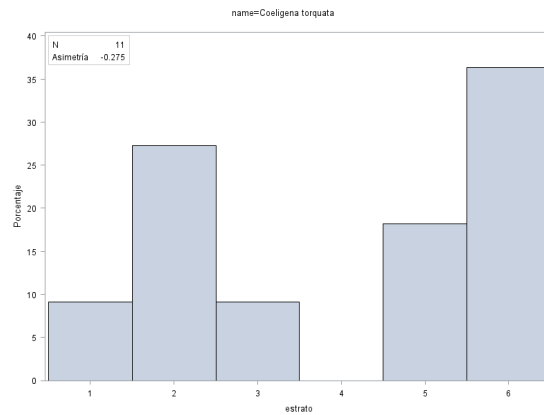
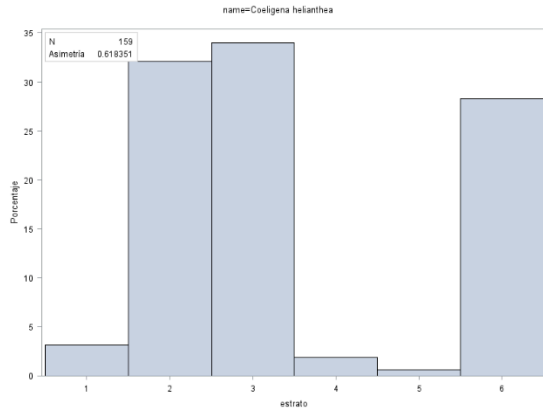
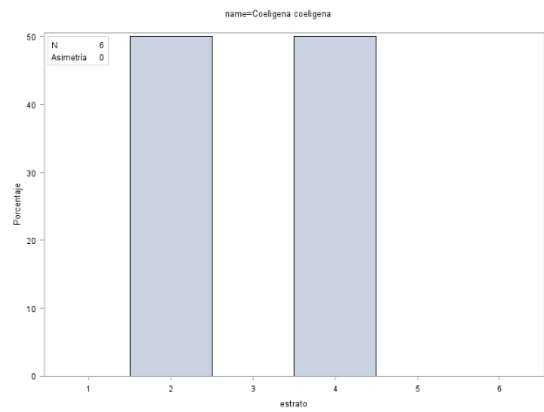
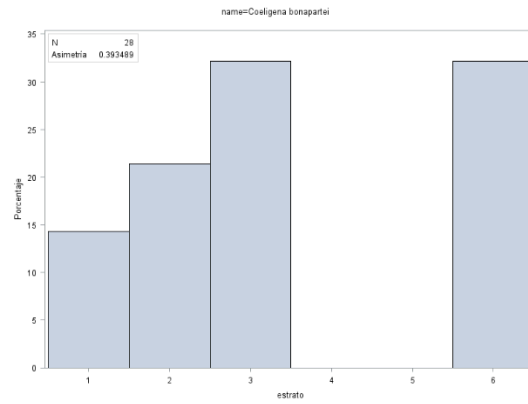
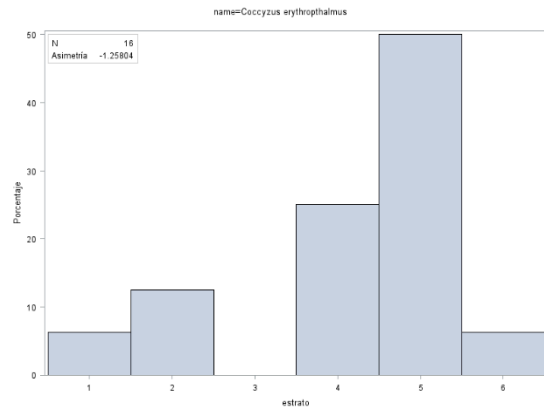


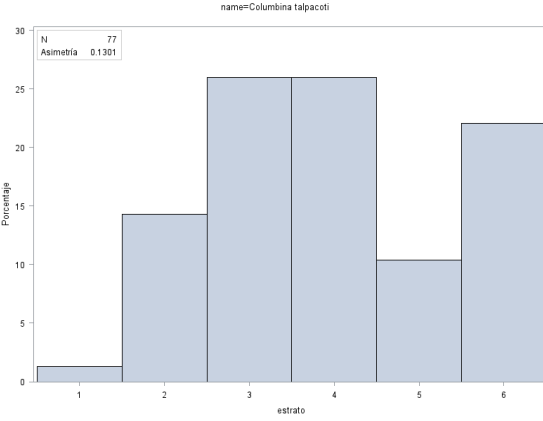
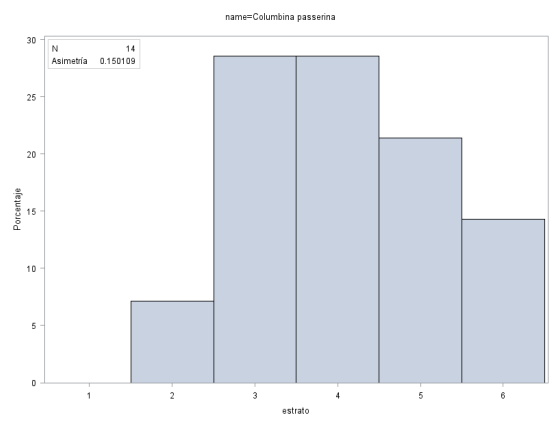
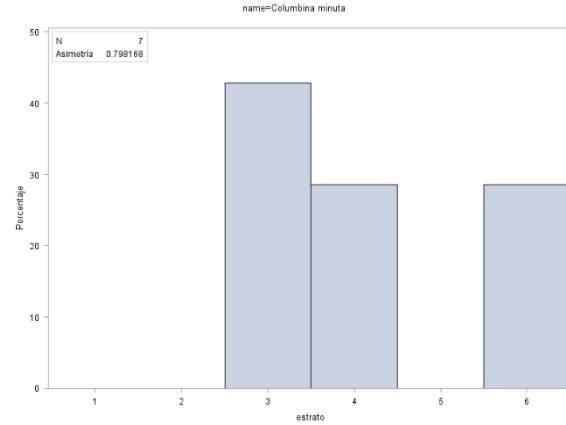
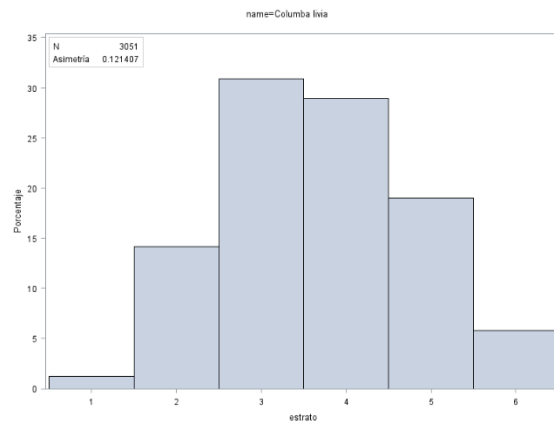
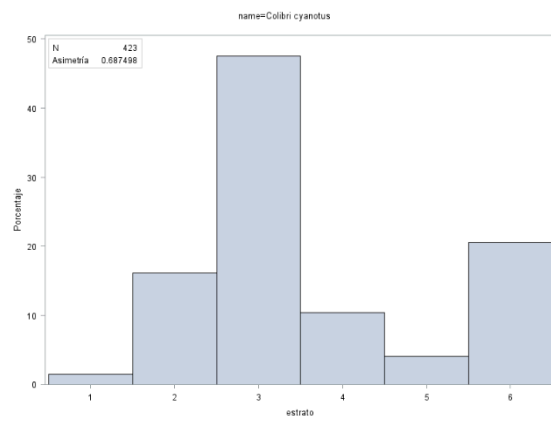
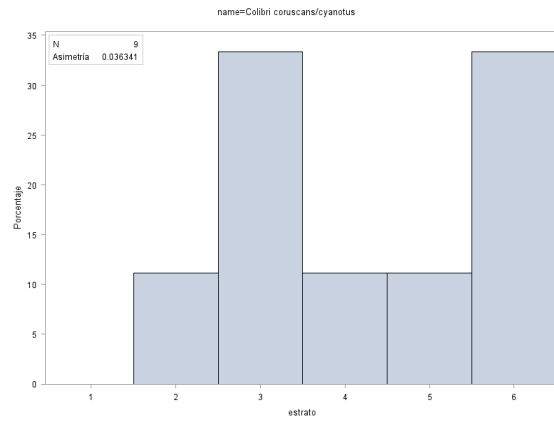


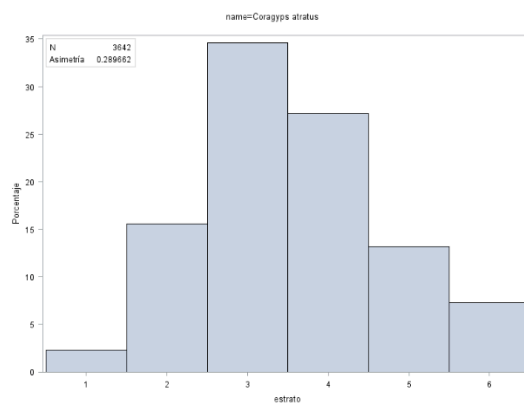
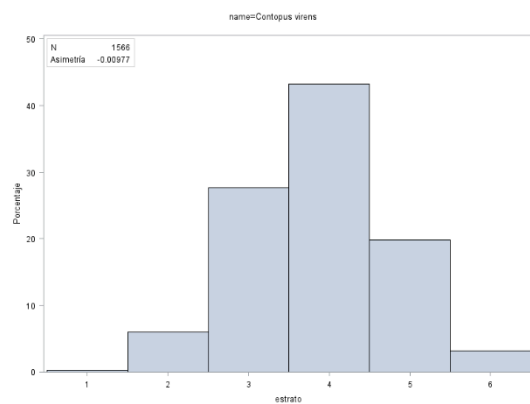
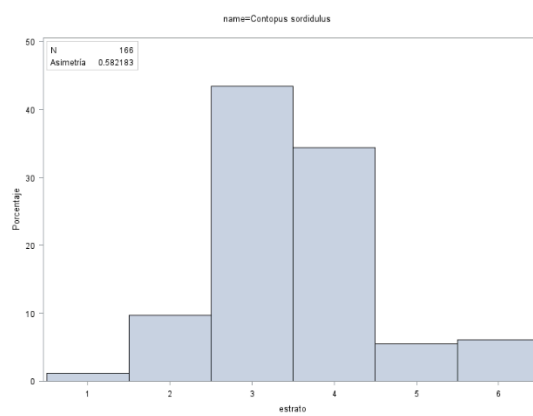
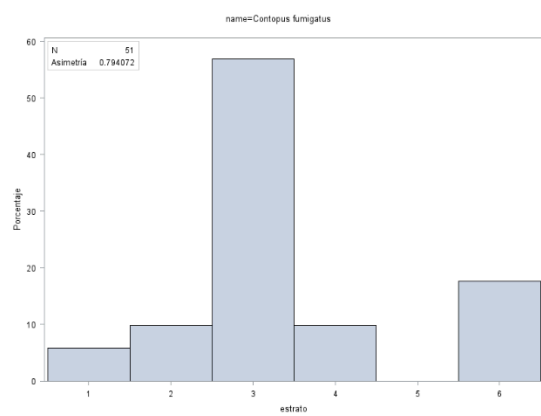
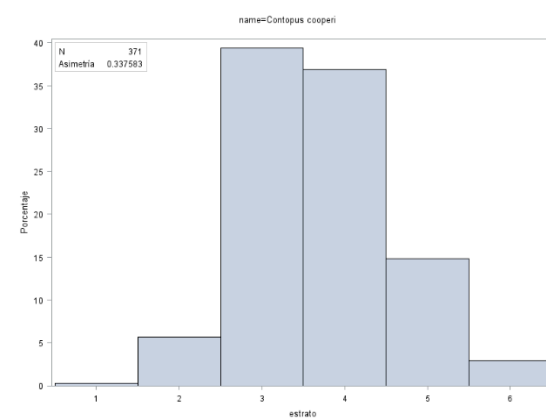
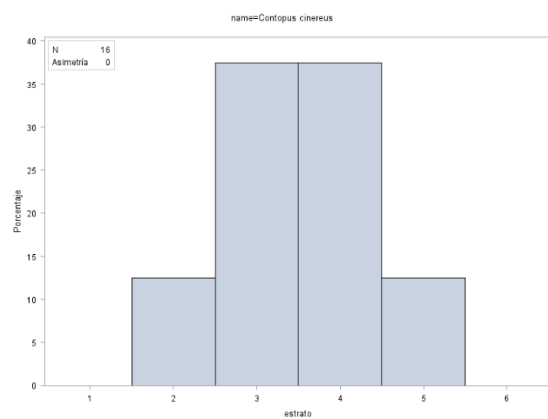
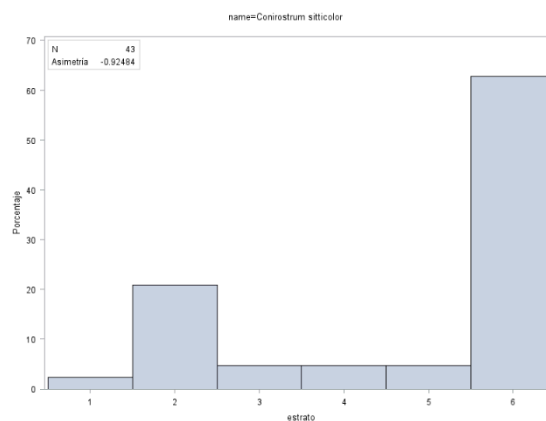
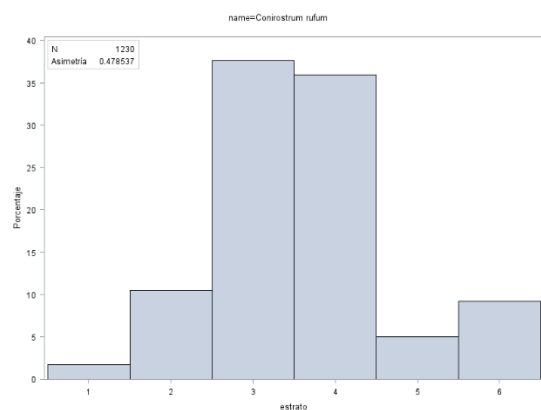


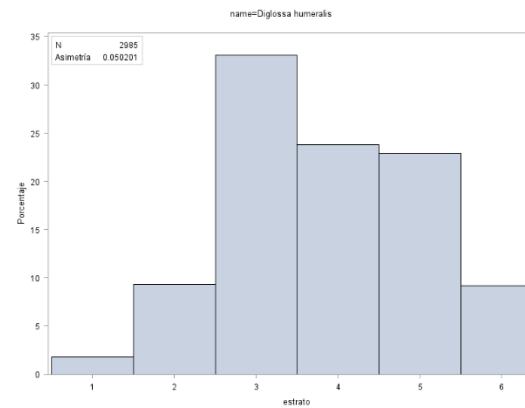
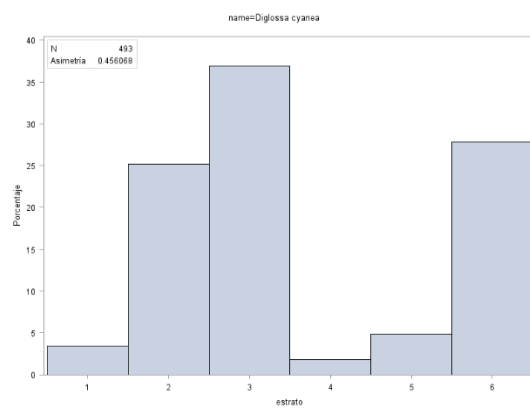
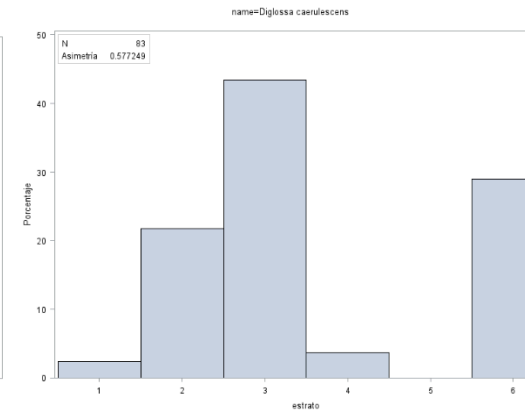
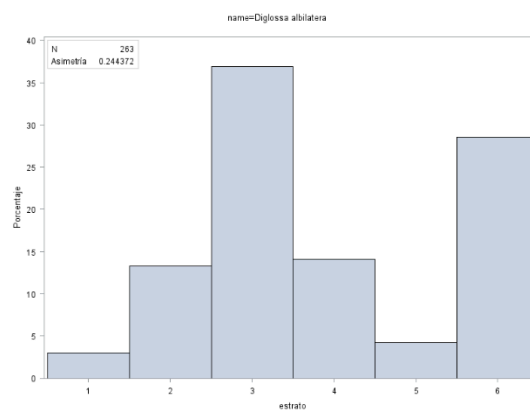
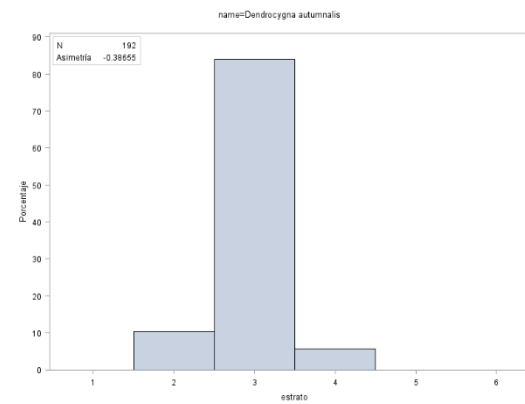
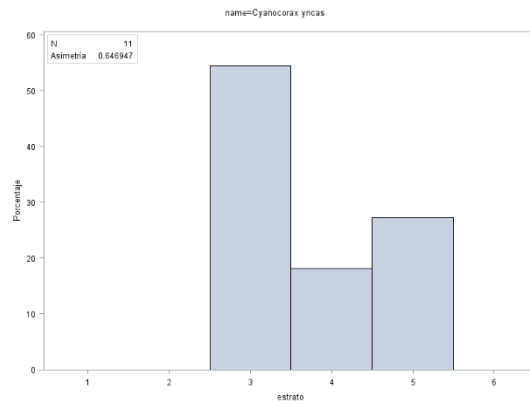
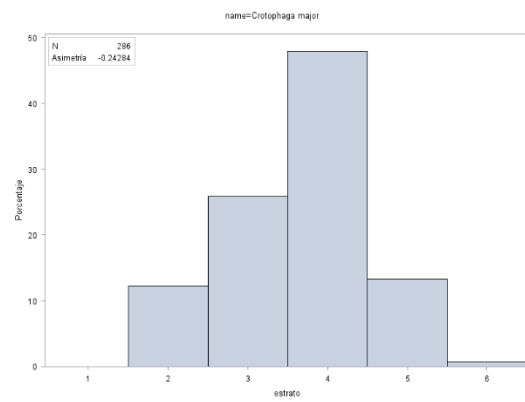
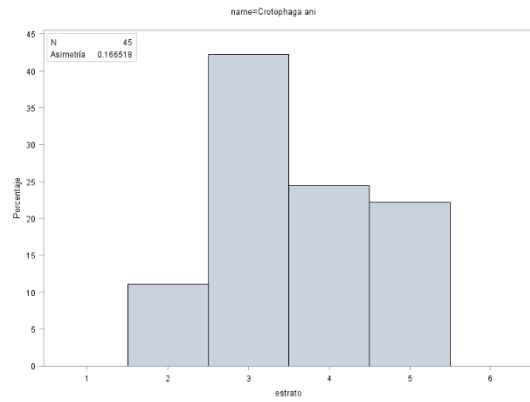


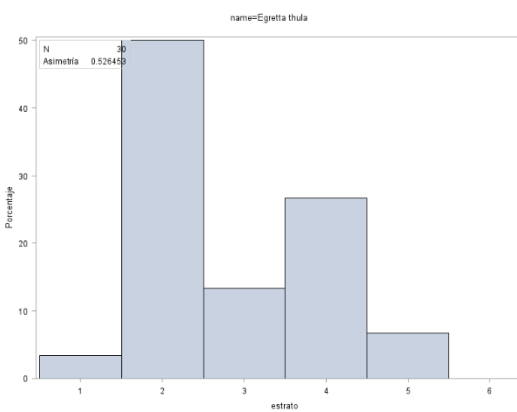
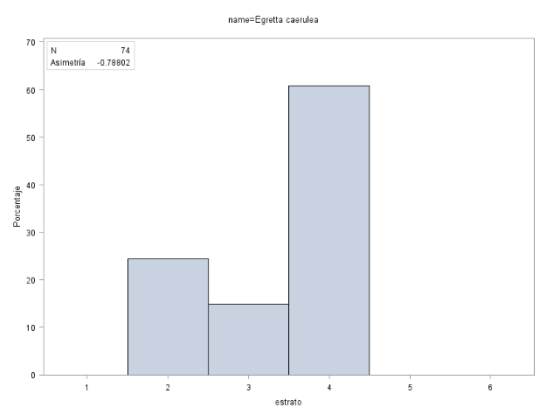
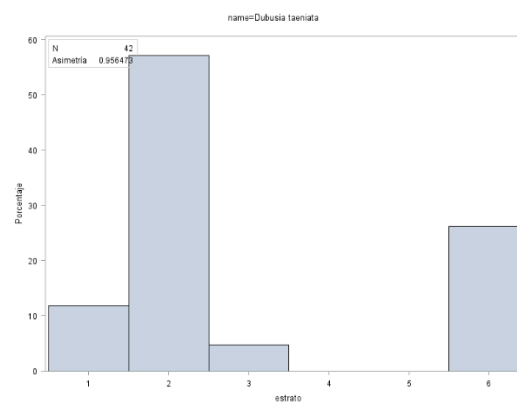
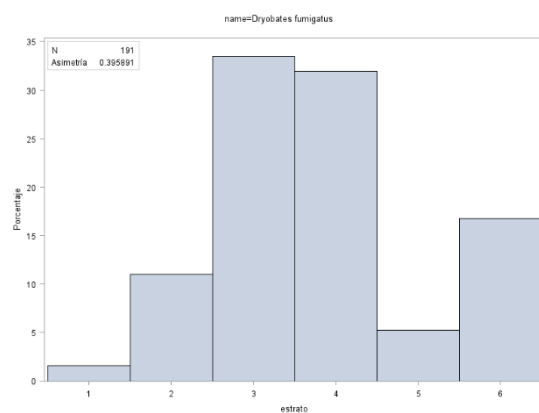
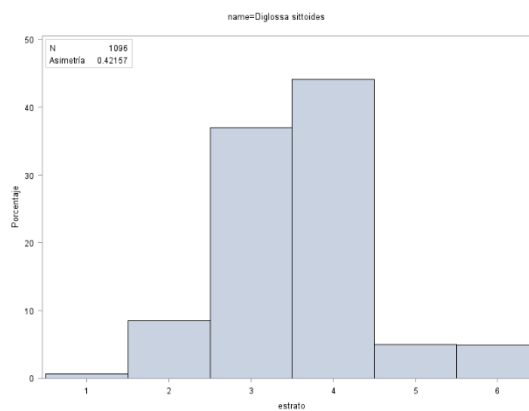
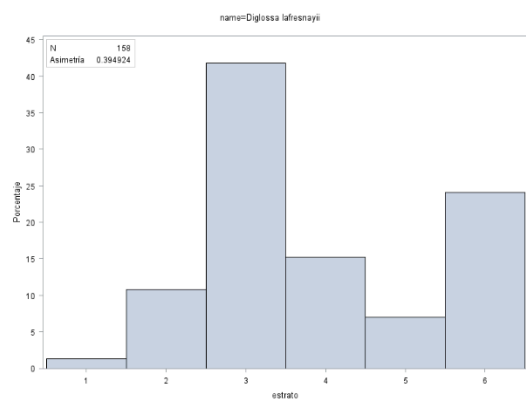


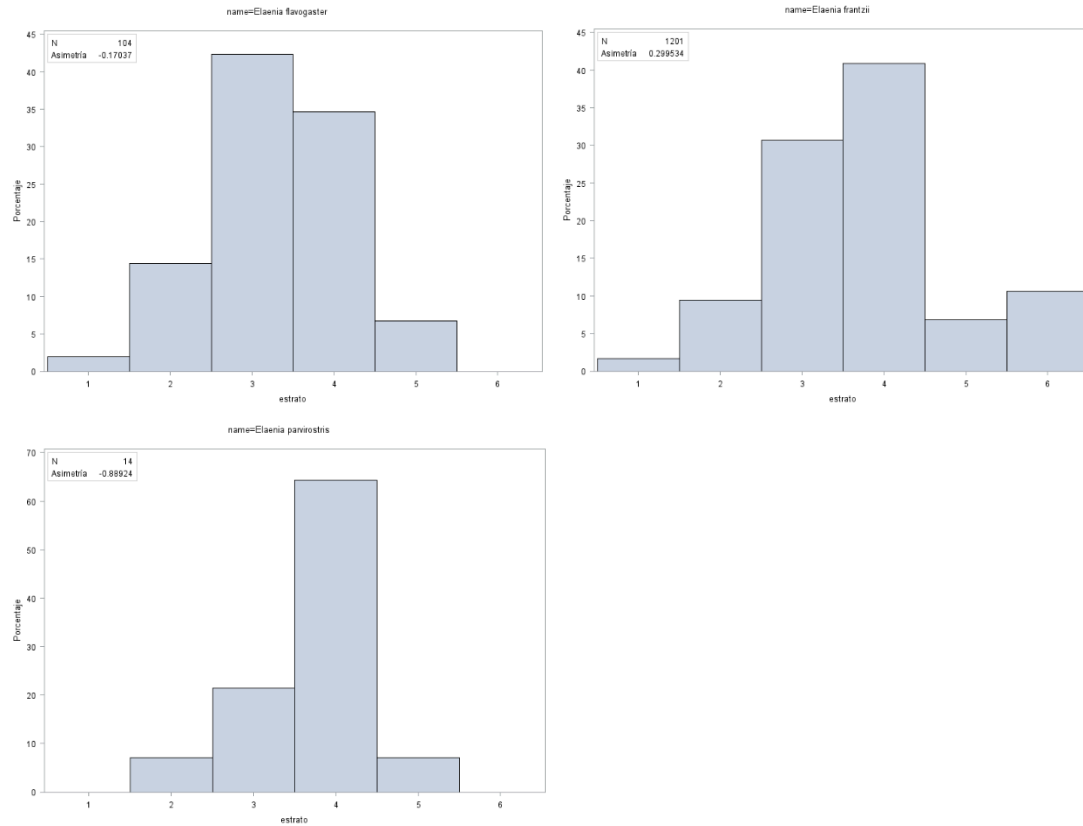












Supplementary Table S1

Species	Stratus	Probability	Correlation
<i>Turdus fuscater</i>	Estrato 1	0.010	0.020
	Estrato 2	0.128	0.020
	Estrato 3	0.313	0.020
	Estrato 4	0.360	-0.020
	Estrato 5	0.133	-0.020
	Estrato 3	0.268	-0.040
	Estrato 4	0.374	-0.039
	Estrato 5	0.080	-0.030
	Estrato 6	0.012	-0.029
<i>Diglossa humeralis</i>	Estrato 1	0.011	-0.016
	Estrato 2	0.069	-0.014
	Estrato 3	0.320	-0.013

	Estrato 4	0.292	0.008
	Estrato 5	0.213	0.015
	Estrato 6	0.095	0.016
<i>Icterus chrysater</i>	Estrato 1	0.010	0.002
	Estrato 2	0.065	0.002
	Estrato 3	0.354	0.005
	Estrato 4	0.372	-0.001
	Estrato 5	0.149	-0.005
	Estrato 6	0.050	-0.006
<i>Spinus psaltria</i>	Estrato 1	0.011	-0.062
	Estrato 2	0.180	-0.063
	Estrato 3	0.353	-0.066
	Estrato 4	0.368	0.064
	Estrato 5	0.069	0.065
	Estrato 6	0.020	0.065
<i>Phimosus infuscatus</i>	Estrato 1	0.004	0.033
	Estrato 2	0.293	0.025
	Estrato 3	0.352	-0.053
	Estrato 4	0.219	-0.021
	Estrato 5	0.124	-0.014
	Estrato 6	0.008	-0.011
<i>Piranga rubra</i>	Estrato 1	0.003	0.008
	Estrato 2	0.071	0.009
	Estrato 3	0.363	0.009
	Estrato 4	0.399	-0.007
	Estrato 5	0.131	-0.010
	Estrato 6	0.034	-0.010
<i>Fulica americana</i>	Estrato 1	0.004	0.090
	Estrato 2	0.216	0.090
	Estrato 3	0.422	0.090
	Estrato 4	0.278	-0.090

	Estrato 5	0.072	-0.090
	Estrato 6	0.007	-0.090
<i>Contopus virens</i>	Estrato 1	0.009	-0.048
	Estrato 2	0.100	-0.048
	Estrato 3	0.293	-0.048
	Estrato 4	0.427	0.048
	Estrato 5	0.146	0.047
	Estrato 6	0.024	0.047
<i>Ardea ibis</i>	Estrato 1	0.013	0.024
	Estrato 2	0.386	0.004
	Estrato 3	0.304	-0.033
	Estrato 4	0.243	0.005
	Estrato 5	0.042	0.017
	Estrato 6	0.011	0.019
<i>Gallinula galeata</i>	Estrato 1	0.002	0.097
	Estrato 2	0.365	0.130
	Estrato 3	0.332	-0.109
	Estrato 4	0.220	-0.132
	Estrato 5	0.078	-0.132
	Estrato 6	0.003	-0.132
<i>Setophaga fusca</i>	Estrato 1	0.008	-0.027
	Estrato 2	0.064	-0.024
	Estrato 3	0.324	-0.009
	Estrato 4	0.407	0.083
	Estrato 5	0.158	-0.003
	Estrato 6	0.040	-0.017
<i>Ardea alba</i>	Estrato 1	0.005	0.032
	Estrato 2	0.208	0.039
	Estrato 3	0.294	0.040
	Estrato 4	0.440	-0.041
	Estrato 5	0.044	-0.041

	Estrato 6	0.009	-0.041
<i>Elaenia frantzii</i>	Estrato 1	0.016	0.029
	Estrato 2	0.068	0.029
	Estrato 3	0.268	0.029
	Estrato 4	0.563	-0.029
	Estrato 5	0.046	-0.029
	Estrato 6	0.038	-0.029
<i>Diglossa sittoides</i>	Estrato 1	0.003	-0.174
	Estrato 2	0.090	-0.174
	Estrato 3	0.343	-0.170
	Estrato 4	0.498	0.176
	Estrato 5	0.044	0.156
	Estrato 6	0.021	0.150
<i>Mecocerculus leucop</i>	Estrato 1	0.016	0.055
	Estrato 2	0.054	0.055
	Estrato 3	0.267	0.053
	Estrato 4	0.364	-0.023
	Estrato 5	0.215	-0.053
	Estrato 6	0.083	-0.051
<i>Thraupis episcopus</i>	Estrato 1	0.004	0.048
	Estrato 2	0.110	0.048
	Estrato 3	0.368	0.049
	Estrato 4	0.411	-0.048
	Estrato 5	0.083	-0.049
	Estrato 6	0.024	-0.049
<i>Conirostrum rufum</i>	Estrato 1	0.007	-0.072
	Estrato 2	0.067	-0.072
	Estrato 3	0.335	-0.071
	Estrato 4	0.542	0.072
	Estrato 5	0.031	0.071
	Estrato 6	0.018	0.071

<i>Chrysomus icteroceph</i>	Estrato 1	0.006	-0.061
	Estrato 2	0.378	-0.009
	Estrato 3	0.404	0.025
	Estrato 4	0.158	0.013
	Estrato 5	0.048	0.011
	Estrato 6	0.006	0.010
<i>Rupornis magnirostr</i>	Estrato 1	0.011	-0.075
	Estrato 2	0.152	-0.074
	Estrato 3	0.337	-0.070
	Estrato 4	0.419	0.073
	Estrato 5	0.067	0.070
	Estrato 6	0.014	0.070
<i>Porphyrio martinica</i>	Estrato 1	0.004	-0.040
	Estrato 2	0.145	-0.042
	Estrato 3	0.564	-0.056
	Estrato 4	0.244	0.047
	Estrato 5	0.037	0.049
	Estrato 6	0.006	0.050
<i>Spinus spinescens</i>	Estrato 1	0.012	-0.002
	Estrato 2	0.208	-0.001
	Estrato 3	0.345	0.005
	Estrato 4	0.368	0.000
	Estrato 5	0.029	-0.002
	Estrato 6	0.039	-0.002
<i>Mimus gilvus</i>	Estrato 1	0.015	-0.054
	Estrato 2	0.378	-0.061
	Estrato 3	0.292	0.050
	Estrato 4	0.226	0.062
	Estrato 5	0.067	0.063
	Estrato 6	0.021	0.064
<i>Elanus leucurus</i>	Estrato 1	0.020	-0.038

	Estrato 2	0.370	-0.042
	Estrato 3	0.383	0.041
	Estrato 4	0.207	0.041
	Estrato 5	0.013	0.040
	Estrato 6	0.008	0.040
<i>Vireo olivaceus</i>	Estrato 1	0.005	-0.165
	Estrato 2	0.069	-0.162
	Estrato 3	0.321	-0.137
	Estrato 4	0.412	0.145
	Estrato 5	0.167	0.108
	Estrato 6	0.026	0.037
<i>Podilymbus podiceps</i>	Estrato 1	0.005	-0.092
	Estrato 2	0.098	-0.092
	Estrato 3	0.301	-0.090
	Estrato 4	0.543	0.095
	Estrato 5	0.047	0.070
	Estrato 6	0.006	0.064
<i>Thraupis palmarum</i>	Estrato 1	0.003	-0.062
	Estrato 2	0.059	-0.064
	Estrato 3	0.452	-0.073
	Estrato 4	0.329	0.068
	Estrato 5	0.127	0.073
	Estrato 6	0.029	0.073
<i>Catharus ustulatus</i>	Estrato 1	0.002	-0.130
	Estrato 2	0.047	-0.130
	Estrato 3	0.359	-0.127
	Estrato 4	0.421	0.099
	Estrato 5	0.152	0.122
	Estrato 6	0.019	0.117
<i>Oxyura ferruginea</i>	Estrato 1	0.002	0.166
	Estrato 2	0.193	0.182

	Estrato 3	0.531	-0.129
	Estrato 4	0.191	-0.178
	Estrato 5	0.082	-0.172
	Estrato 6	0.001	-0.170
<i>Spatula discors</i>	Estrato 1	0.001	-0.084
	Estrato 2	0.329	-0.085
	Estrato 3	0.405	0.062
	Estrato 4	0.193	0.087
	Estrato 5	0.069	0.088
	Estrato 6	0.004	0.088
<i>Synallaxis subpudic</i>	Estrato 1	0.041	-0.096
	Estrato 2	0.123	-0.097
	Estrato 3	0.337	-0.101
	Estrato 4	0.306	0.095
	Estrato 5	0.120	0.100
	Estrato 6	0.074	0.102
<i>Piranga olivacea</i>	Estrato 1	0.003	-0.059
	Estrato 2	0.063	-0.058
	Estrato 3	0.323	-0.047
	Estrato 4	0.442	0.073
	Estrato 5	0.135	0.035
	Estrato 6	0.034	0.018
<i>Buteo platypterus</i>	Estrato 1	0.012	-0.146
	Estrato 2	0.067	-0.150
	Estrato 3	0.321	-0.172
	Estrato 4	0.484	-0.178
	Estrato 5	0.099	0.197
	Estrato 6	0.018	0.204
<i>Pyrocephalus rubinu</i>	Estrato 1	0.005	-0.175
	Estrato 2	0.136	-0.174
	Estrato 3	0.308	-0.169

	Estrato 4	0.536	0.172
	Estrato 5	0.015	0.168
	Estrato 6		-0.082
<i>Tringa solitaria</i>	Estrato 1	0.004	-0.105
	Estrato 2	0.340	0.084
	Estrato 3	0.434	0.114
	Estrato 4	0.195	0.117
	Estrato 5	0.025	0.117
	Estrato 6	0.002	0.065
<i>Butorides striata</i>	Estrato 1	0.002	0.070
	Estrato 2	0.234	0.010
	Estrato 3	0.458	-0.077
	Estrato 4	0.236	-0.080
	Estrato 5	0.066	-0.081
	Estrato 6	0.004	0.079
<i>Tyrannus tyrannus</i>	Estrato 1	0.013	0.077
	Estrato 2	0.150	0.070
	Estrato 3	0.310	-0.078
	Estrato 4	0.435	-0.067
	Estrato 5	0.081	-0.065
	Estrato 6	0.011	0.062
<i>Setophaga petechia</i>	Estrato 1	0.001	0.062
	Estrato 2	0.099	0.062
	Estrato 3	0.312	-0.063
	Estrato 4	0.491	-0.058
	Estrato 5	0.084	-0.056
	Estrato 6	0.013	-0.101
<i>Nycticorax nycticor</i>	Estrato 1	0.009	-0.112
	Estrato 2	0.405	0.086
	Estrato 3	0.228	0.114
	Estrato 4	0.305	0.117

	Estrato 5	0.046	0.118
	Estrato 6	0.007	-0.094
<i>Sturnella magna</i>	Estrato 1	0.039	-0.106
	Estrato 2	0.464	0.101
	Estrato 3	0.269	0.108
	Estrato 4	0.215	0.108
	Estrato 5	0.005	0.108
	Estrato 6	0.009	-0.041
<i>Quiscalus lugubris</i>	Estrato 1	0.006	-0.110
	Estrato 2	0.637	0.110
	Estrato 3	0.276	0.109
	Estrato 4	0.069	0.108
	Estrato 5	0.010	0.108
	Estrato 6	0.003	-0.094
<i>Leiothlypis peregrina</i>	Estrato 1	0.004	-0.094
	Estrato 2	0.040	-0.091
	Estrato 3	0.281	0.067
	Estrato 4	0.525	0.073
	Estrato 5	0.130	0.029
	Estrato 6	0.020	-0.089
<i>Nannopterum brasili</i>	Estrato 1	0.005	-0.089
	Estrato 2	0.091	-0.090
	Estrato 3	0.123	-0.025
	Estrato 4	0.677	0.093
	Estrato 5	0.094	0.089
	Estrato 6	0.010	0.020
<i>Coccyzus americanus</i>	Estrato 1	0.004	0.017
	Estrato 2	0.106	0.001
	Estrato 3	0.321	-0.063
	Estrato 4	0.430	0.022
	Estrato 5	0.127	0.048

	Estrato 6	0.012	0.094
<i>Forpus conspicillat</i>	Estrato 1	0.001	0.098
	Estrato 2	0.195	0.109
	Estrato 3	0.376	-0.100
	Estrato 4	0.287	-0.104
	Estrato 5	0.134	-0.104
	Estrato 6	0.006	-0.048
<i>Pheucticus aureoventer</i>	Estrato 1	0.057	-0.040
	Estrato 2	0.051	-0.009
	Estrato 3	0.370	0.045
	Estrato 4	0.306	0.015
	Estrato 5	0.155	0.007
	Estrato 6	0.061	-0.003
<i>Chaetocercus mulsan</i>	Estrato 1	0.009	-0.003
	Estrato 2	0.079	-0.002
	Estrato 3	0.420	0.004
	Estrato 4	0.220	0.003
	Estrato 5	0.228	0.002
	Estrato 6	0.045	0.087
<i>Actitis macularia</i>	Estrato 1	0.004	0.087
	Estrato 2	0.107	0.084
	Estrato 3	0.143	-0.087
	Estrato 4	0.736	-0.060
	Estrato 5	0.005	-0.059
	Estrato 6	0.005	0.004
<i>Parkesia noveboracensis</i>	Estrato 1	0.131	0.002
	Estrato 2	0.329	-0.004
	Estrato 3	0.414	-0.001
	Estrato 4	0.118	-0.001
	Estrato 5	0.008	-0.069
	Estrato 6		-0.083

<i>Contopus cooperi</i>	Estrato 1	0.009	-0.132
	Estrato 2	0.106	0.099
	Estrato 3	0.362	0.120
	Estrato 4	0.401	0.122
	Estrato 5	0.103	-0.098
	Estrato 6	0.019	-0.097
<i>Setophaga ruticilla</i>	Estrato 1	0.003	-0.091
	Estrato 2	0.022	0.021
	Estrato 3	0.210	0.071
	Estrato 4	0.555	0.055
	Estrato 5	0.174	-0.270
	Estrato 6	0.035	-0.268
<i>Cardellina canadens</i>	Estrato 1	0.041	-0.060
	Estrato 2	0.284	0.258
	Estrato 3	0.447	0.216
	Estrato 4	0.186	0.083
	Estrato 5	0.041	-0.052
	Estrato 6		-0.084
<i>Tringa flavipes</i>	Estrato 1	0.323	-0.085
	Estrato 2	0.420	-0.151
	Estrato 3	0.209	-0.160
	Estrato 4	0.048	0.136
	Estrato 5		0.158
	Estrato 6		-0.026
<i>Crotophaga major</i>	Estrato 1	0.173	0.048
	Estrato 2	0.307	0.049
	Estrato 3	0.416	0.054
	Estrato 4	0.101	-0.050
	Estrato 5	0.005	-0.054
	Estrato 6		-0.054
<i>Tyrannus savana</i>	Estrato 1	0.007	0.071

	Estrato 2	0.167	0.071
	Estrato 3	0.353	0.074
	Estrato 4	0.419	-0.073
	Estrato 5	0.048	-0.074
	Estrato 6	0.005	-0.074
<i>Icterus icterus</i>	Estrato 1	0.004	-0.038
	Estrato 2	0.029	-0.044
	Estrato 3	0.668	-0.060
	Estrato 4	0.192	0.037
	Estrato 5	0.103	0.060
	Estrato 6	0.004	0.063
<i>Icterus nigrogulari</i>	Estrato 1	0.006	0.037
	Estrato 2	0.118	0.038
	Estrato 3	0.246	0.043
	Estrato 4	0.406	-0.012
	Estrato 5	0.210	-0.046
	Estrato 6	0.015	-0.050
<i>Myiodynastes luteiv</i>	Estrato 1	0.002	0.045
	Estrato 2	0.053	0.045
	Estrato 3	0.334	0.039
	Estrato 4	0.400	-0.044
	Estrato 5	0.182	-0.044
	Estrato 6	0.029	-0.044
<i>Sicalis flaveola</i>	Estrato 1	0.006	-0.025
	Estrato 2	0.269	-0.021
	Estrato 3	0.343	-0.003
	Estrato 4	0.345	0.029
	Estrato 5	0.020	0.015
	Estrato 6	0.016	0.007
<i>Colibri cyanotus</i>	Estrato 1	0.025	-0.092
	Estrato 2	0.167	-0.093

	Estrato 3	0.403	0.006
	Estrato 4	0.201	0.092
	Estrato 5	0.048	0.093
	Estrato 6	0.156	0.093
<i>Lesbia nuna</i>	Estrato 1	0.035	-0.148
	Estrato 2	0.251	0.226
	Estrato 3	0.368	0.104
	Estrato 4	0.098	0.100
	Estrato 5	0.049	-0.198
	Estrato 6	0.199	-0.191
<i>Dendrocygna autumnna</i>	Estrato 1	0.084	0.223
	Estrato 2	0.869	0.172
	Estrato 3	0.044	0.163
	Estrato 4	0.002	-0.012
	Estrato 5		-0.013
	Estrato 6		-0.014
<i>Mniotilta varia</i>	Estrato 1	0.019	0.012
	Estrato 2	0.291	0.014
	Estrato 3	0.549	0.015
	Estrato 4	0.110	0.124
	Estrato 5	0.031	0.123
	Estrato 6		-0.123
<i>Pandion haliaetus</i>	Estrato 1	0.015	-0.123
	Estrato 2	0.235	-0.123
	Estrato 3	0.149	-0.123
	Estrato 4	0.509	-0.120
	Estrato 5	0.074	-0.121
	Estrato 6	0.020	-0.125
<i>Rallus semiplumbeus</i>	Estrato 1	0.003	0.121
	Estrato 2	0.730	0.122
	Estrato 3	0.173	0.124

	Estrato 4	0.084	-0.030
	Estrato 5	0.008	0.094
	Estrato 6	0.003	0.251
<i>Diglossa cyanea</i>	Estrato 1	0.025	0.099
	Estrato 2	0.180	0.031
	Estrato 3	0.440	-0.068
	Estrato 4	0.071	0.020
	Estrato 5	0.077	0.034
	Estrato 6	0.208	0.051
<i>Anisognathus ignive</i>	Estrato 1	0.126	-0.045
	Estrato 2	0.143	-0.053
	Estrato 3	0.183	-0.054
	Estrato 4	0.129	0.280
	Estrato 5	0.021	-0.274
	Estrato 6	0.399	-0.286
<i>Asio stygius</i>	Estrato 1	0.007	-0.287
	Estrato 2	0.081	-0.088
	Estrato 3	0.286	0.080
	Estrato 4	0.512	0.091
	Estrato 5	0.081	0.093
	Estrato 6	0.033	-0.071
<i>Porphyriops melanop</i>	Estrato 1	0.523	-0.072
	Estrato 2	0.345	-0.077
	Estrato 3	0.129	0.076
	Estrato 4	0.003	0.079
	Estrato 5		-0.085
	Estrato 6		-0.084
<i>Tringa melanoleuca</i>	Estrato 1	0.498	-0.081
	Estrato 2	0.262	-0.059
	Estrato 3	0.186	0.082
	Estrato 4	0.054	0.074

	Estrato 5		0.073
	Estrato 6		0.075
<i>Vireo flavoviridis</i>	Estrato 1	0.044	-0.062
	Estrato 2	0.197	-0.076
	Estrato 3	0.557	-0.075
	Estrato 4	0.168	-0.075
	Estrato 5	0.033	0.003
	Estrato 6		0.004
<i>Systellura longirostris</i>	Estrato 1	0.003	0.009
	Estrato 2	0.048	-0.004
	Estrato 3	0.152	-0.006
	Estrato 4	0.303	-0.006
	Estrato 5	0.305	-0.089
	Estrato 6	0.189	-0.091
<i>Sicalis luteola</i>	Estrato 1	0.021	-0.100
	Estrato 2	0.419	0.078
	Estrato 3	0.351	0.085
	Estrato 4	0.191	0.094
	Estrato 5	0.009	-0.077
	Estrato 6	0.009	-0.226
<i>Asio clamator</i>	Estrato 1	0.021	0.107
	Estrato 2	0.173	0.166
	Estrato 3	0.424	0.173
	Estrato 4	0.278	0.180
	Estrato 5	0.100	-0.234
	Estrato 6	0.003	-0.233
<i>Grallaria ruficapilla</i>	Estrato 1	0.165	-0.122
	Estrato 2	0.072	0.223
	Estrato 3	0.296	0.207
	Estrato 4	0.096	0.207
	Estrato 5	0.030	-0.027

	Estrato 6	0.341	-0.028
<i>Lesbia victoriae</i>	Estrato 1	0.122	-0.069
	Estrato 2	0.334	0.051
	Estrato 3	0.318	0.053
	Estrato 4	0.086	0.053
	Estrato 5	0.017	0.010
	Estrato 6	0.123	-0.225
<i>Sayornis nigricans</i>	Estrato 1	0.067	0.035
	Estrato 2	0.128	0.241
	Estrato 3	0.402	0.254
	Estrato 4	0.380	0.023
	Estrato 5	0.007	0.012
	Estrato 6	0.016	-0.017
<i>Ramphocelus dimidia</i>	Estrato 1	0.003	-0.009
	Estrato 2	0.030	-0.009
	Estrato 3	0.860	-0.049
	Estrato 4	0.090	-0.068
	Estrato 5	0.007	0.002
	Estrato 6	0.010	0.069
<i>Pitangus sulphuratu</i>	Estrato 1	0.017	0.070
	Estrato 2	0.165	0.070
	Estrato 3	0.567	-0.015
	Estrato 4	0.203	0.015
	Estrato 5	0.048	0.015
	Estrato 6		-0.185
<i>Pheucticus ludovici</i>	Estrato 1	0.037	-0.146
	Estrato 2	0.387	0.186
	Estrato 3	0.443	0.198
	Estrato 4	0.122	0.199
	Estrato 5	0.011	-0.082
	Estrato 6		-0.085

<i>Riparia riparia</i>	Estrato 1	0.007	0.083
	Estrato 2	0.344	0.085
	Estrato 3	0.134	0.085
	Estrato 4	0.429	-0.142
	Estrato 5	0.068	-0.146
	Estrato 6	0.018	-0.153
<i>Cissopis leverianus</i>	Estrato 1	0.979	0.142
	Estrato 2	0.017	0.157
	Estrato 3	0.003	0.158
	Estrato 4		0.017
	Estrato 5		0.029
	Estrato 6		-0.017
<i>Hirundo rustica</i>	Estrato 1	0.274	-0.032
	Estrato 2	0.171	-0.033
	Estrato 3	0.421	-0.037
	Estrato 4	0.078	-0.033
	Estrato 5	0.057	-0.036
	Estrato 6		-0.064
<i>Contopus sordidulus</i>	Estrato 1	0.086	0.050
	Estrato 2	0.346	0.065
	Estrato 3	0.470	0.068
	Estrato 4	0.059	-0.100
	Estrato 5	0.039	-0.099
	Estrato 6		-0.099
<i>Petrochelidon pyrrh</i>	Estrato 1	0.029	0.099
	Estrato 2	0.174	0.098
	Estrato 3	0.089	0.098
	Estrato 4	0.626	0.036
	Estrato 5	0.066	0.036
	Estrato 6	0.016	0.037

<i>Metallura tyrianthi</i>	Estrato 1	0.038	-0.035
	Estrato 2	0.377	-0.037
	Estrato 3	0.388	-0.037
	Estrato 4	0.047	-0.201
	Estrato 5	0.008	-0.221
	Estrato 6	0.141	-0.012
<i>Dryobates fumigatus</i>	Estrato 1	0.023	0.213
	Estrato 2	0.037	0.216
	Estrato 3	0.509	0.215
	Estrato 4	0.335	-0.116
	Estrato 5	0.055	-0.134
	Estrato 6	0.041	0.126
<i>Empidonax virescens</i>	Estrato 1	0.008	0.139
	Estrato 2	0.147	0.140
	Estrato 3	0.254	0.084
	Estrato 4	0.504	0.082
	Estrato 5	0.064	-0.091
	Estrato 6	0.024	-0.078
<i>Diglossa albilatera</i>	Estrato 1	0.004	-0.076
	Estrato 2	0.109	0.055
	Estrato 3	0.404	0.147
	Estrato 4	0.277	0.167
	Estrato 5	0.050	-0.067
	Estrato 6	0.155	-0.092
<i>Patagioenas fasciat</i>	Estrato 1	0.157	-0.128
	Estrato 2	0.071	0.094
	Estrato 3	0.371	0.092
	Estrato 4	0.186	-0.065
	Estrato 5	0.056	-0.203
	Estrato 6	0.160	-0.036
<i>Myiarchus crinitus</i>	Estrato 1	0.064	0.009

	Estrato 2	0.425	0.010
	Estrato 3	0.438	0.007
	Estrato 4	0.064	-0.052
	Estrato 5	0.009	-0.002
	Estrato 6		0.000
<i>Setophaga striata</i>	Estrato 1	0.061	-0.095
	Estrato 2	0.225	-0.095
	Estrato 3	0.579	-0.091
	Estrato 4	0.121	0.097
	Estrato 5	0.014	0.093
	Estrato 6		0.090
<i>Atlapetes pallidinu</i>	Estrato 1	0.147	0.086
	Estrato 2	0.064	0.086
	Estrato 3	0.342	0.086
	Estrato 4	0.097	0.083
	Estrato 5	0.013	0.037
	Estrato 6	0.336	-0.086
<i>Progne tapera</i>	Estrato 1	0.005	0.015
	Estrato 2	0.152	0.015
	Estrato 3	0.089	0.015
	Estrato 4	0.262	-0.015
	Estrato 5	0.469	-0.015
	Estrato 6	0.023	-0.015
<i>Catharus minimus</i>	Estrato 1	0.010	0.063
	Estrato 2	0.272	0.063
	Estrato 3	0.510	0.061
	Estrato 4	0.198	0.057
	Estrato 5	0.010	0.055
	Estrato 6		-0.062
<i>Diglossa lafresnayi</i>	Estrato 1	0.015	-0.045
	Estrato 2	0.045	-0.047

	Estrato 3	0.423	0.039
	Estrato 4	0.192	0.047
	Estrato 5	0.076	0.048
	Estrato 6	0.248	0.172
<i>Myiothlypis nigrocr</i>	Estrato 1	0.238	0.174
	Estrato 2	0.082	-0.201
	Estrato 3	0.041	-0.158
	Estrato 4	0.165	-0.141
	Estrato 5	0.042	0.394
	Estrato 6	0.431	-0.394
<i>Falco columbarius</i>	Estrato 1	0.016	-0.394
	Estrato 2	0.153	-0.152
	Estrato 3	0.223	-0.221
	Estrato 4	0.518	0.208
	Estrato 5	0.084	0.226
	Estrato 6	0.005	0.212
<i>Scytalopus griseico</i>	Estrato 1	0.111	-0.210
	Estrato 2	0.050	0.210
	Estrato 3	0.239	0.195
	Estrato 4	0.035	0.210
	Estrato 5	0.017	-0.210
	Estrato 6	0.547	-0.210
<i>Empidonax alnorum</i>	Estrato 1	0.095	-0.210
	Estrato 2	0.268	0.122
	Estrato 3	0.352	0.082
	Estrato 4	0.206	-0.130
	Estrato 5	0.078	-0.092
	Estrato 6		-0.077
<i>Elaenia flavogaster</i>	Estrato 1	0.006	0.010
	Estrato 2	0.387	0.010
	Estrato 3	0.339	0.019

	Estrato 4	0.222	-0.013
	Estrato 5	0.047	-0.021
	Estrato 6		-0.023
<i>Asio flammeus</i>	Estrato 1	0.812	0.030
	Estrato 2	0.106	0.029
	Estrato 3	0.082	-0.029
	Estrato 4		-0.029
	Estrato 5		-0.029
	Estrato 6		-0.029
<i>Arremon assimilis</i>	Estrato 1	0.020	0.042
	Estrato 2	0.790	-0.043
	Estrato 3	0.094	-0.041
	Estrato 4	0.014	-0.122
	Estrato 5	0.082	-0.138
	Estrato 6		-0.217
<i>Gymnomystax mexican</i>	Estrato 1	0.695	-0.335
	Estrato 2	0.292	-0.340
	Estrato 3	0.013	0.201
	Estrato 4		-0.310
	Estrato 5		0.310
	Estrato 6		0.309
<i>Gallinago nobilis</i>	Estrato 1	0.603	-0.020
	Estrato 2	0.311	0.070
	Estrato 3	0.036	0.007
	Estrato 4	0.051	-0.017
	Estrato 5		-0.022
	Estrato 6		0.053
<i>Pygochelidon cyanol</i>	Estrato 1	0.193	0.051
	Estrato 2	0.446	-0.057

	Estrato 3	0.213	-0.045
	Estrato 4	0.114	-0.224
	Estrato 5	0.034	-0.223
	Estrato 6		-0.217
<i>Megascops choliba</i>	Estrato 1	0.007	0.224
	Estrato 2	0.046	0.220
	Estrato 3	0.531	0.217
	Estrato 4	0.290	-0.085
	Estrato 5	0.105	-0.085
	Estrato 6	0.020	0.085
<i>Egretta thula</i>	Estrato 1	0.007	0.085
	Estrato 2	0.747	0.085
	Estrato 3	0.167	0.274
	Estrato 4	0.067	0.299
	Estrato 5	0.007	-0.301
	Estrato 6	0.007	-0.280
<i>Egretta caerulea</i>	Estrato 1	0.594	-0.256
	Estrato 2	0.161	-0.285
	Estrato 3	0.245	-0.218
	Estrato 4		0.134
	Estrato 5		0.292
	Estrato 6		0.292
<i>Penelope montagnii</i>	Estrato 1	0.051	0.289
	Estrato 2	0.094	-0.106
	Estrato 3	0.355	0.089
	Estrato 4	0.029	0.112
	Estrato 5	0.037	0.114
	Estrato 6	0.433	0.114
<i>Amazona ochrocephal</i>	Estrato 1	0.134	-0.041
	Estrato 2	0.858	0.067
	Estrato 3	0.008	0.049

	Estrato 4		0.034
	Estrato 5		0.004
	Estrato 6		-0.090
<i>Geothlypis philadel</i>	Estrato 1	0.192	-0.087
	Estrato 2	0.335	-0.068
	Estrato 3	0.346	0.083
	Estrato 4	0.075	0.077
	Estrato 5	0.052	-0.093
	Estrato 6		-0.122
<i>Chordeiles minor</i>	Estrato 1	0.054	-0.170
	Estrato 2	0.162	-0.194
	Estrato 3	0.723	0.134
	Estrato 4	0.061	-0.032
	Estrato 5		-0.010
	Estrato 6		0.038
<i>Columbina talpacoti</i>	Estrato 1	0.008	0.008
	Estrato 2	0.116	0.005
	Estrato 3	0.356	-0.005
	Estrato 4	0.249	-0.262
	Estrato 5	0.109	-0.262
	Estrato 6	0.163	0.262
<i>Falco peregrinus</i>	Estrato 1	0.184	0.262
	Estrato 2	0.322	0.262
	Estrato 3	0.308	-0.060
	Estrato 4	0.145	-0.061
	Estrato 5	0.040	-0.067
	Estrato 6		0.058
<i>Serpophaga cinerea</i>	Estrato 1	0.055	0.068
	Estrato 2	0.566	0.055
	Estrato 3	0.335	-0.119

	Estrato 4	0.008	-0.115
	Estrato 5	0.036	-0.096
	Estrato 6		0.113
<i>Eriocnemis vestita</i>	Estrato 1	0.159	0.104
	Estrato 2	0.056	0.103
	Estrato 3	0.312	0.099
	Estrato 4	0.189	0.101
	Estrato 5	0.024	0.113
	Estrato 6	0.260	-0.107
<i>Porzana carolina</i>	Estrato 1	0.342	-0.117
	Estrato 2	0.340	-0.040
	Estrato 3	0.233	-0.066
	Estrato 4	0.077	0.051
	Estrato 5	0.009	0.064
	Estrato 6		0.065
<i>Ensifera ensifera</i>	Estrato 1	0.680	-0.178
	Estrato 2	0.229	-0.230
	Estrato 3	0.026	0.165
	Estrato 4	0.025	0.228
	Estrato 5	0.040	0.221
	Estrato 6		0.221
<i>Catharus fuscescens</i>	Estrato 1	0.108	0.221
	Estrato 2	0.110	-0.221
	Estrato 3	0.482	-0.221
	Estrato 4	0.270	0.145
	Estrato 5	0.029	-0.137
	Estrato 6		-0.156
<i>Henicorhina leucoph</i>	Estrato 1	0.029	-0.030
	Estrato 2	0.342	0.030
	Estrato 3	0.019	0.184
	Estrato 4	0.095	0.184

	Estrato 5	0.515	-0.184
	Estrato 6		-0.184
<i>Coeligena helianthe</i>	Estrato 1	0.060	-0.184
	Estrato 2	0.478	0.033
	Estrato 3	0.323	0.039
	Estrato 4	0.010	0.080
	Estrato 5	0.030	-0.038
	Estrato 6	0.099	-0.050
<i>Protonotaria citrea</i>	Estrato 1	0.010	0.243
	Estrato 2	0.330	0.246
	Estrato 3	0.577	0.254
	Estrato 4	0.072	-0.184
	Estrato 5	0.010	-0.252
	Estrato 6		-0.259
<i>Ampelion rubrocrist</i>	Estrato 1	0.021	-0.011
	Estrato 2	0.031	-0.009
	Estrato 3	0.397	0.017
	Estrato 4	0.417	0.028
	Estrato 5	0.082	-0.481
	Estrato 6	0.052	-0.493
<i>Anas andium</i>	Estrato 1	0.051	-0.192
	Estrato 2	0.153	0.479
	Estrato 3	0.328	0.477
	Estrato 4	0.392	0.068
	Estrato 5	0.051	0.058
	Estrato 6	0.025	-0.067
<i>Atlapetes schistace</i>	Estrato 1	0.023	-0.057
	Estrato 2	0.083	-0.092
	Estrato 3	0.530	-0.115
	Estrato 4	0.317	0.100
	Estrato 5	0.047	0.112

	Estrato 6		-0.205
<i>Buteo brachyurus</i>	Estrato 1	0.117	-0.269
	Estrato 2	0.379	0.079
	Estrato 3	0.445	0.224
	Estrato 4	0.047	0.240
	Estrato 5	0.012	0.244
	Estrato 6		-0.273
<i>Buteo swainsoni</i>	Estrato 1	0.092	-0.180
	Estrato 2	0.191	0.257
	Estrato 3	0.473	0.309
	Estrato 4	0.245	0.181
	Estrato 5		-0.093
	Estrato 6		-0.187
<i>Catamenia analis</i>	Estrato 1	0.025	0.129
	Estrato 2	0.330	0.193
	Estrato 3	0.322	0.198
	Estrato 4	0.063	-0.034
	Estrato 5	0.262	-0.027
	Estrato 6		-0.012
<i>Cathartes aura</i>	Estrato 1	0.474	0.027
	Estrato 2	0.401	-0.082
	Estrato 3	0.126	-0.109
	Estrato 4		0.084
	Estrato 5		0.096
	Estrato 6		0.093
<i>Contopus bogotensis</i>	Estrato 1	0.975	0.105
	Estrato 2	0.025	0.106
	Estrato 3		0.114
	Estrato 4		-0.110

	Estrato 5		-0.113
	Estrato 6		-0.067
<i>Crotophaga ani</i>	Estrato 1	0.026	-0.124
	Estrato 2	0.607	-0.280
	Estrato 3	0.268	0.149
	Estrato 4	0.087	0.226
	Estrato 5	0.013	-0.229
	Estrato 6		-0.193
<i>Elaenia parvirostri</i>	Estrato 1	0.247	-0.137
	Estrato 2	0.493	0.204
	Estrato 3	0.178	0.104
	Estrato 4	0.082	-0.104
	Estrato 5		-0.252
	Estrato 6		-0.321
<i>Empidonax traillii</i>	Estrato 1	0.154	-0.383
	Estrato 2	0.019	0.027
	Estrato 3	0.538	0.413
	Estrato 4	0.058	-0.042
	Estrato 5	0.231	0.007
	Estrato 6		0.137
<i>Eriocnemis cupreove</i>	Estrato 1	0.076	0.153
	Estrato 2	0.134	-0.474
	Estrato 3	0.216	-0.539
	Estrato 4	0.375	0.488
	Estrato 5	0.071	0.520
	Estrato 6	0.129	0.526