

Article

Species Recognition of Native and Exotic Animals Among Primary Pupils and Prospective Teachers in Extremadura (Spain): Implications for Biodiversity Education

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Abstract

This study examines species recognition of native and exotic animals among primary school pupils and prospective teachers in Extremadura, Spain, to identify patterns of species-level biological knowledge relevant to biodiversity education and conservation awareness. A total of 201 participants (97 pupils and 104 prospective teachers) completed a questionnaire featuring 24 animal images equally divided between native and exotic species. Both groups showed higher recognition of widely known exotic fauna, whereas recognition of native species varied considerably. Although emblematic native species such as the Iberian lynx and red deer were generally well identified, less conspicuous taxa, including the genet, beech marten, and common wall gecko, were frequently misidentified. Prospective teachers achieved higher overall recognition rates than pupils but still showed notable gaps regarding several locally relevant species. These findings suggest that species recognition may be shaped by uneven educational and cultural exposure and highlight the importance of integrating regionally grounded biodiversity content into school curricula and initial teacher training to support biodiversity conservation-oriented education.

Keywords: biological literacy; science education; teacher education; native and exotic species; biodiversity education

1. Introduction

Biodiversity education is not merely about transmitting content knowledge; it involves fostering appreciation for the natural world and understanding the ecological relationships that sustain it. Early contact with nature has been shown to support children's cognitive development, strengthen environmental responsibility, and encourage pro-environmental behaviors [1–3]. For future teachers, high-quality biodiversity education is especially important, as they will influence how younger generations perceive and engage with their immediate environment [4]. Within formal education, biodiversity learning encompasses multiple dimensions, among which biological literacy—including basic knowledge and recognition of organisms—constitutes an important cognitive component relevant to science education and biodiversity conservation education.

At the international level, educational research and conservation frameworks increasingly emphasize the importance of strengthening scientific and biological literacy from an early age, including knowledge related to biodiversity and living organisms. Understanding how young people recognize and differentiate biological organisms is relevant



Received: 29 May 2026

Revised: 3 July 2026

Accepted: 7 July 2026

Published: 9 July 2026

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not only for science education, but also for biodiversity conservation, since familiarity with species may influence attention toward local fauna and interest in biodiversity-related issues. Within formal education, species-level knowledge underpins curriculum objectives related to classification, biodiversity, and biological diversity in school science [5,6].

Species familiarity is shaped by formal education and also by informal learning contexts, including television, films, digital platforms, social media, and other cultural representations of wildlife. Repeated exposure to certain animals through these channels can increase their visibility and memorability, influencing which species become more familiar to children and young people. Recent studies have shown that natural history films can increase public awareness of the species depicted, often generating stronger attention to specific animals than to broader conservation messages [7,8]. Similarly, social media has become an important space in which wildlife is represented and interpreted, potentially shaping how people perceive and discuss animal species [9,10].

Extremadura, located in southwestern Spain, is one of the most biodiverse regions of the Iberian Peninsula. It hosts emblematic native species such as the Iberian imperial eagle (*Aquila adalberti*), black stork (*Ciconia nigra*), Iberian lynx (*Lynx pardinus*), and red deer (*Cervus elaphus*), which are of high conservation value and central to regional environmental identity [11]. However, despite this richness, several studies have highlighted a tendency, particularly among young people, to be more familiar with charismatic exotic fauna widely portrayed in global media than with local species found in their own surroundings [12–14]. This pattern raises concerns about uneven familiarity with local biodiversity and the limited visibility of regionally relevant fauna within educational and cultural contexts.

In the educational context of Extremadura, it is therefore relevant to examine whether both Primary Education pupils and prospective teachers recognize local fauna and distinguish it from more mediatized exotic species. Although natural sciences are included in the Spanish Primary curriculum, the emphasis placed on regional biodiversity may vary, and teacher training programs do not always sufficiently integrate local ecological knowledge [4]. Within science education, the ability to recognize and correctly identify common organisms represents a basic component of biological literacy and an important foundation for later understanding of ecological concepts and biodiversity-related issues [5,6]. Accordingly, the present study focuses specifically on species recognition as a measurable component of biological knowledge relevant to biodiversity education and teacher preparation.

The objective of this study was therefore to evaluate the level of recognition and familiarity with native animal species among Primary School pupils and prospective teachers in Extremadura and to compare this with their recognition of widely known exotic animals. The findings aim to identify strengths and gaps in species recognition between Primary Education pupils and prospective teachers and to contribute regional evidence relevant to biodiversity education, conservation awareness, and teacher training.

2. Materials and Methods

For the purposes of this study, native species are defined as animal species that occur naturally in the region of Extremadura and form part of its regional fauna. The term local is used descriptively to refer to species associated with the immediate geographical context of the study area and is employed here synonymously with native for simplicity. In contrast, exotic species refer to animals that do not occur naturally in the study region and are generally encountered through educational materials, media, or representations from other geographical contexts rather than through direct local presence. Within this framework, the study focuses specifically on species recognition as a measurable component of biological knowledge and biodiversity education.

2.1. Sample

A total of 201 participants were recruited through non-probability convenience sampling. The sample comprised 97 Primary Education pupils from urban schools in Extremadura, Spain (mean age = 10.6 years), and 104 students enrolled in the Primary Education Degree program at the University of Extremadura during the 2022–2023 academic year (mean age = 20.5 years). The participants had received the standard exposure to biodiversity and living organisms included in the Spanish Primary and Secondary Education curriculum, but no additional individual information was collected regarding previous extracurricular experiences, specific biodiversity education programs, or personal contact with wildlife. This sampling approach enabled comparison between current pupils and prospective teachers within the same regional educational context. The study was conducted in accordance with institutional ethical guidelines and complied with the ethical standards of the University of Extremadura for educational research. Ethical approval was granted by the University of Extremadura Ethics Committee (Ref: 154/2023). Informed consent was obtained from all adult participants, and parental or legal guardian consent was obtained for minors. Data collection and analysis were conducted under full anonymity.

2.2. Instrument and Data Analysis

The instrument consisted of a questionnaire containing 24 animal images (Figure 1), and participants were asked to write the names of those they could recognize. The images were intentionally presented in a standardized format, without background or environmental context, to isolate species recognition from contextual or habitat-based cues. This approach is commonly used in studies of species identification and biological knowledge, as it allows for a more controlled assessment of participants' ability to recognize organisms based on morphological characteristics rather than environmental associations [13,15,16]. Because the study compared recognition of local fauna with recognition of globally familiar exotic animals, the expected level of naming precision differed between the two groups of species: native species were assessed using vernacular species-level names relevant to the regional educational context, whereas exotic species were assessed using the generic common names by which they are typically presented in school materials and popular culture. The selection included 12 species native to Extremadura—black stork (*Ciconia nigra*), genet (*Genetta genetta*), ocellated lizard (*Timon lepidus*), wild boar (*Sus scrofa*), Iberian lynx (*Lynx pardinus*), red deer (*Cervus elaphus*), griffon vulture (*Gyps fulvus*), beech marten (*Martes foina*), red-legged partridge (*Alectoris rufa*), crane (*Grus grus*), fire salamander (*Salamandra salamandra*), and common wall gecko (*Tarentola mauritanica*)—and 12 exotic species, including giraffe (*Giraffa camelopardalis*), elephant (*Loxodonta africana*), zebra (*Equus quagga*), lemur (*Lemur catta*), axolotl (*Ambystoma mexicanum*), raccoon (*Procyon lotor*), sloth (*Bradypus variegatus*), hippopotamus (*Hippopotamus amphibius*), penguin (*Aptenodytes forsteri*), laughing hyena (*Crocuta crocuta*), koala (*Phascolarctos cinereus*), and tiger (*Panthera tigris*). The selection of the 24 species was guided by educational and ecological criteria rather than by quantitative measures of abundance or media exposure. Native species were chosen to represent a range of taxonomic groups commonly included in school science curricula and present in the regional fauna of Extremadura, including both widely recognized emblematic species (e.g., Iberian lynx, red deer) and less conspicuous taxa (e.g., genet, beech marten, common wall gecko). Exotic species were selected based on their frequent appearance in educational materials, children's media, and popular culture, as documented in previous research on species recognition and cultural salience [12,14,17].

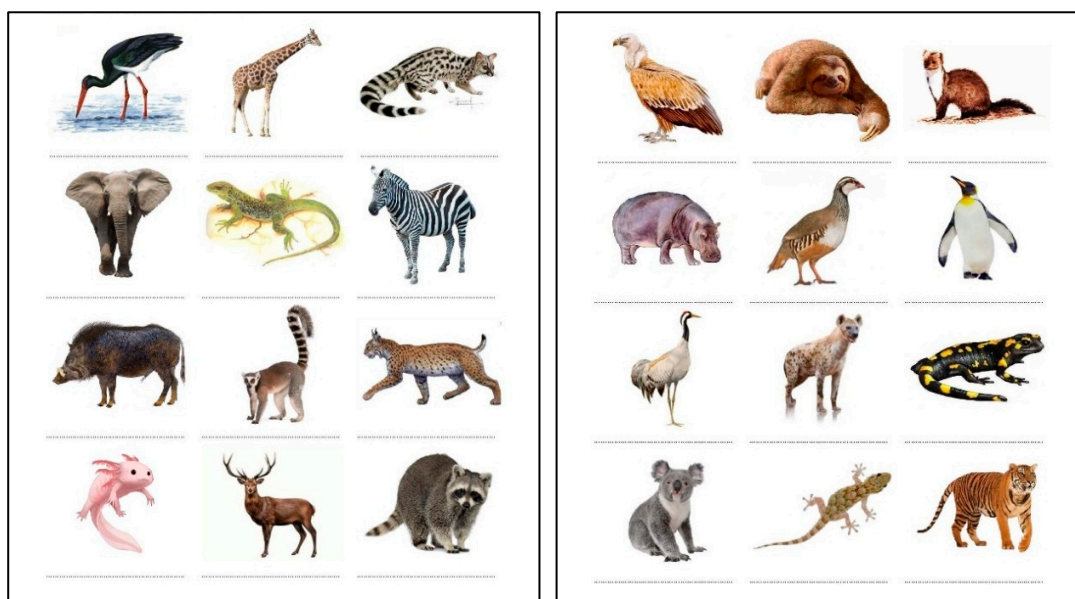


Figure 1. Animals shown in the questionnaire.

As noted above, responses were coded as correct when participants provided an appropriate common name that clearly referred to the animal depicted. Scientific (Latin) names were not required. For native fauna, correct responses were defined at the species level using widely accepted vernacular names in the Spanish educational context (e.g., *ciervo rojo* for red deer, *lince ibérico* for Iberian lynx), as these distinctions are commonly emphasized in regional biodiversity education. More generic labels (e.g., “deer”, “lizard”) were coded as incorrect when they did not allow differentiation from other native species included in the questionnaire or from ecologically distinct taxa.

For exotic animals, responses were considered correct when participants used the commonly employed generic name in everyday and educational language (e.g., “elephant”, “penguin”), without requiring identification at the species level. This criterion reflects the way exotic fauna is typically presented in school materials and popular media, where species-level distinctions are often not emphasized. The aim was to assess recognition rather than detailed taxonomic knowledge, particularly for animals not native to the study region.

Differences between groups were analyzed using Chi-square tests in JASP 0.16.0 (University of Amsterdam, Amsterdam, The Netherlands). For each Chi-square test, effect size was calculated using Cramér’s *V* to estimate the magnitude of the differences between Primary Education pupils and prospective teachers. Detailed analysis of misidentifications was conducted for native species because these errors help identify specific difficulties in recognizing locally relevant fauna and distinguishing them from other taxa. In contrast, misnaming of exotic species was comparatively rare and typically involved generic labels rather than systematic confusions between similar taxa; therefore, error patterns for exotic species were not analyzed at the same level of detail.

3. Results and Discussion

To address the objective of comparing species recognition across educational stages, the results are presented in two parts. First, we examine the recognition of native species characteristic of Extremadura, followed by the analysis of exotic species that are widely represented in global media and educational materials. This structure reflects the comparative nature of the study and facilitates the identification of distinct patterns linked to educational level and cultural exposure, showing how different social groups develop patterns of species recognition related to animal identification. Detailed statistical results,

including Chi-square values, p -values, and Cramér's V effect sizes for all comparisons, are provided in Supplementary Table S1.

3.1. Recognition of Animals from Extremadura

Prospective teachers showed a consistently higher recognition of native animal species than Primary school pupils (Figure 2), with statistically significant differences in all cases except for the genet, the marten, and the gecko. Among the most recognized native species were the wild boar (88.7% in pupils; 96.2% in prospective teachers), the Iberian lynx (72.2% and 86.5%, respectively), and the red deer (76.3% and 91.3%). In contrast, the least recognized species were the genet, which was not identified by any Primary pupil and only by 13.5% of prospective teachers; the marten, also unrecognized by all pupils and identified by just 1% of prospective teachers; and the gecko, recognized by 12.4% and 20.2%, respectively. These results indicate a greater familiarity with prominent and emblematic native fauna, particularly in the case of prospective teachers, while low recognition rates of species such as the genet, marten, and gecko suggest that less conspicuous native species may receive less attention within formal educational contexts, potentially contributing to lower recognition rates [12,14,16,18,19].

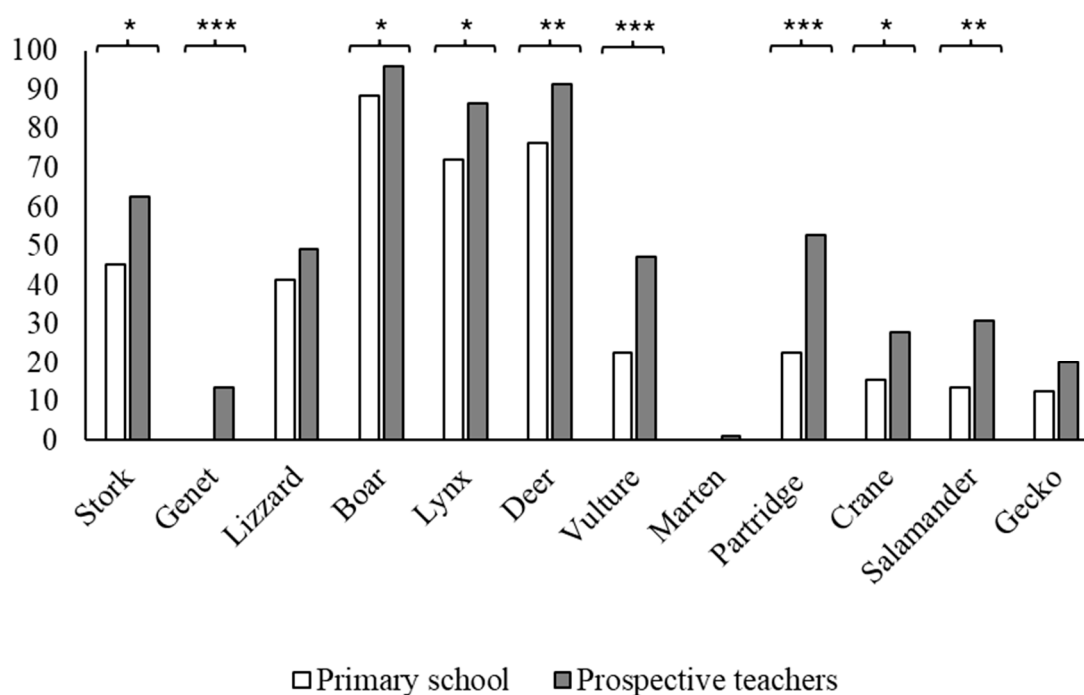


Figure 2. Recognition rate of native animals in Primary Education students and prospective teachers. (* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$). Complete statistical results, including Chi-square values and Cramér's V effect sizes, are presented in Supplementary Table S1.

This pattern is consistent with the well-documented influence of flagship species, defined as charismatic animals that tend to receive greater visibility in educational materials and public discourse [20]. In our study, species such as the Iberian lynx, red deer, wild boar, and black stork, widely featured in conservation campaigns and regional identity, showed much higher recognition than less iconic native fauna. The uneven familiarity observed reflects what has been termed the native species awareness disparity [13], indicating that cultural and educational exposure may privilege a narrow subset of emblematic species while overlooking others of equal ecological relevance.

Regarding misidentifications (Table 1), several errors appeared to be based on morphological similarity, like confusion between stork, crane, and heron, or among the wall

lizard, salamander, and gecko. More notably, both Primary pupils and prospective teachers frequently misidentified native species as exotic ones [15]. The ocellated lizard was often mistaken for the iguana or chameleon, while the Iberian lynx was confused with large exotic felines such as the leopard, cheetah, or tiger. The marten was misidentified as a squirrel, ferret, or skunk, and the deer was sometimes confused with reindeer or moose. These confusions may reflect the greater salience of widely known animal archetypes, which can influence how learners categorize and label unfamiliar or less distinctive species, as has been reported in studies on species recognition and misidentification in educational contexts [12,14,15,19].

Table 1. Most common mistakes in native species, in Primary Education students and in prospective teachers. Numbers indicate the percentage of individuals. (P.S., Primary School students; P.T., prospective teachers).

Animal	Level	Most Common Mistakes
Stork	P.S.	Crane (11.3%), Heron (5.2%), Pelican (3.1%), Ostrich (2%)
	P.T.	Crane (12.5%), Heron (4.8%), Pelican (3.8%)
Genet	P.S.	Ferret (3.1%), Skunk (3.1%), Leopard (3.1%)
	P.T.	Skunk (3.8%), Coyote (3.8%)
Lizard	P.S.	Wall lizard (19.6%), Iguana (15.5%), Gecko (6.1%), Salamander (4.1%), Chameleon (4.1%)
	P.T.	Iguana (16%), Wall lizard (13%), Salamander (4.1%), Gecko (2.8%), Chameleon (1.9%)
Lynx	P.S.	Leopard (5.1%), Tiger (4.1%), Cougar (3.1%), Cheetah (3.1%)
	P.T.	Leopard (4.8%), Cheetah (3.8%)
Deer	P.S.	Reindeer (16.5%)
	P.T.	Moose (2.9%)
Vulture	P.S.	Eagle (52.5%), Stork (5%)
	P.T.	Eagle (33.62%), Falcon (3.8%)
Martes	P.S.	Squirrel (12.4%), Ferret (11.3%), Fox (8.2%)
	P.T.	Ferret (29.8%), Skunk (3.8%), Squirrel (2.8%), Meerkat (1.9%)
Partridge	P.S.	Pigeon (11.3%), Duck (5.1%)
	P.T.	Duck (2.8%)
Crane	P.S.	Ostrich (7.2%), Peacock (5.1%)
	P.T.	Ostrich (5.8%)
Salamander	P.S.	Gecko (15.4%), Frog (12.4%), Lizard (9.3%), Iguana (4.1%), Wall lizard (4.1%)
	P.T.	Triton (11.5%), Lizard (5.8%), Gecko (5.7%), Frog (3.8%)
Gecko	P.S.	Wall lizard (43.3%), Salamander (5.1%), Iguana (5.1%), Chameleon (4.1%)
	P.T.	Wall lizard (61.6%), Salamander (12.5%)

These findings are consistent with previous research reporting greater recognition of globally iconic animal species than of less prominent local fauna [12–14]. From an educational perspective, this pattern is relevant because prospective teachers play an important role in selecting examples, species, and references used in classroom instruction. Persistent gaps in species-level biological knowledge during initial teacher training may therefore influence how biodiversity content is represented in school science lessons. This highlights the importance of addressing species recognition explicitly within teacher education programs to ensure that future teachers possess sufficiently broad and contextually relevant biological knowledge to support balanced biodiversity education and greater visibility of locally relevant fauna within educational contexts.

Although the general pattern of higher recognition of globally iconic or exotic species than of local fauna has already been reported in previous studies [12–14], the present study

adds several specific contributions. First, it documents this pattern in Extremadura, a region of high biodiversity value where several native species are central to regional conservation identity. Second, it compares Primary school pupils and prospective teachers within the same geographical and educational context, showing that a higher educational level is associated with better recognition of native fauna but does not eliminate gaps regarding less conspicuous local species. Third, the analysis of misidentifications provides additional insight into how native species are categorized when they are not correctly recognized, revealing confusions not only among morphologically similar taxa but also with widely familiar exotic animals. In this sense, the study extends previous evidence by showing how an already documented recognition disparity appears in a regional context of conservation relevance and persists, to some extent, into initial teacher education.

An additional aspect emerging from the results is that species recognition appears to be influenced not only by whether species are native or exotic, but also by taxonomic group and body size. In both participant groups, large mammals such as the Iberian lynx, red deer, elephant, giraffe, and zebra were among the most frequently recognized species, whereas reptiles, amphibians, and smaller mammals consistently showed lower recognition rates. Similar taxonomic biases have been widely reported in biodiversity education and conservation research, where large-bodied vertebrates generally receive greater educational attention, media visibility, and public interest than less conspicuous taxa [21,22]. The present findings therefore suggest that improving species recognition requires not only increasing the representation of native fauna in educational contexts but also promoting a more balanced coverage of different taxonomic groups, particularly those that are ecologically important but receive comparatively little educational and cultural attention.

3.2. Recognition of Exotic Animals

Recognition of exotic animals was generally high in both groups (Figure 3). The most correctly identified species were the giraffe (99.0% in both groups), elephant (100.0% in Primary pupils and 99.0% in prospective teachers), and zebra (99.0% and 98.1%, respectively). However, there were notable differences for certain species. The lemur was recognized by only 23.7% of Primary pupils but by 71.2% of prospective teachers, whereas the axolotl showed the opposite pattern: 81.4% recognition among Primary pupils compared to only 25.0% among prospective teachers. In general, prospective teachers tended to show higher recognition rates for exotic fauna, except for the axolotl. Statistically significant differences were also found for other species such as the cheetah and the koala, with prospective teachers achieving higher accuracy in both cases.

These contrasting patterns may be partly interpreted in relation to differences in generational exposure to popular media content, although media exposure was not directly measured in this study. The higher familiarity with the axolotl among Primary pupils may be linked to its recent visibility in social networks and video games popular among children and adolescents (e.g., Fortnite, Roblox, Minecraft) [23]. In contrast, the higher recognition of lemurs among prospective teachers may correspond to earlier media representations, such as the Madagascar film series released in the mid-2000s. Similar effects may also apply to species like the cheetah or koala, which have been featured in films and televised wildlife programs during the formative years of the prospective teacher cohort [9,10,19,24]. These findings are consistent with the hypothesis that mediated cultural environments may contribute to species recognition, as repeated representations of wildlife during childhood and adolescence may increase familiarity with particular animal species.

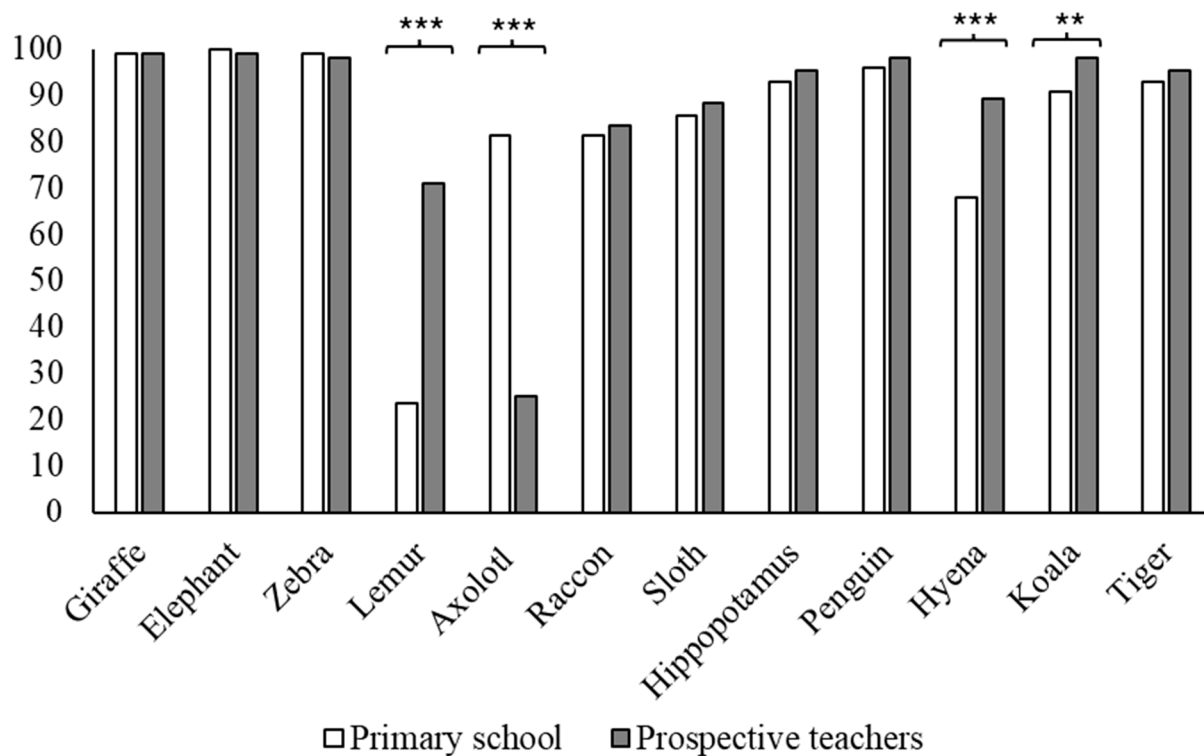


Figure 3. Recognition rate of exotic animals, in Primary Education students and prospective teachers (** $p < 0.01$; *** $p < 0.001$). Complete statistical results, including Chi-square values and Cramér's V effect sizes, are presented in Supplementary Table S1.

From an educational standpoint, these results suggest that species recognition among pupils and prospective teachers may be shaped by a combination of formal science instruction and informal cultural exposure, as documented in previous research on biodiversity knowledge acquisition [12,14,19]. While previous research suggests that mediated representations of wildlife can increase familiarity with certain globally iconic species [7,8], the present study cannot determine the extent to which media exposure contributed to the observed recognition patterns [7,8]. Nevertheless, the findings support the educational relevance of incorporating regionally representative species into teaching materials and learning activities, so that biodiversity instruction reflects both global and local biological diversity and supports balanced species recognition [13,16].

Finally, it is important to note that the present study does not assume a competitive or exclusionary relationship between recognition of exotic and native species. Familiarity with globally iconic fauna does not necessarily imply a lack of knowledge about locally relevant species, as individuals may simultaneously recognize both [13,19]. The observed differences in recognition patterns are therefore interpreted as reflecting differences in emphasis and visibility across educational and cultural contexts, rather than a direct trade-off or substitution between exotic and local species knowledge [14].

4. Conclusions

The findings of this study reveal clear differences in species recognition between Primary school pupils and prospective teachers in Extremadura. Although prospective teachers generally showed higher recognition of native fauna, both groups demonstrated greater familiarity with widely known exotic species than with several locally relevant taxa. These results suggest that species recognition is shaped by uneven educational and cultural exposure, leading to differences in familiarity across animal groups.

From an educational perspective, these findings highlight the importance of explicitly addressing species recognition within school science curricula and initial teacher education programs. Regionally relevant fauna should not be treated as supplementary content but incorporated more systematically into biodiversity education through examples and learning materials connected to local ecosystems. Since teachers play an important role in selecting biological examples and references used in classroom instruction, strengthening species-level biological knowledge during initial teacher training may contribute to more balanced and contextually grounded biodiversity teaching. Such approaches may also help increase the visibility of local fauna within educational contexts and support biodiversity conservation education.

At a practical level, several actions could help improve recognition of native species in school and teacher education contexts. School curricula, textbooks, and teaching materials could include a broader range of regionally relevant fauna, especially less conspicuous groups such as reptiles, amphibians, small mammals, and common birds. Initial teacher education programs could also incorporate local species identification tasks, comparison activities between native and exotic fauna, analysis of common misidentifications, and the design of classroom resources focused on nearby biodiversity. In schools, these actions could be complemented with local field guides, image-based identification activities, small classroom projects on regional species, visits to natural areas, and age-appropriate citizen science initiatives.

In addition to classroom-based approaches, these findings also point to the value of strengthening collaboration between educational institutions and actors directly involved in biodiversity research, management, and protection. Partnerships with universities, protected area managers, conservation practitioners, scientific researchers, environmental education centers, and local organizations could provide students and prospective teachers with more direct and meaningful contact with regional biodiversity. Initiatives such as workshops, seminars, field visits, school talks, citizen science activities, and meetings with biodiversity professionals may help connect species recognition with real conservation practices, making local fauna more visible and relevant in educational contexts.

This study focused specifically on species recognition as a measurable component of biological literacy and did not assess participants' understanding of ecological relationships, attitudes toward biodiversity, or emotional engagement with nature. Consequently, the findings should be interpreted as reflecting differences in species recognition rather than broader differences in biodiversity understanding or conservation awareness. In addition, the use of standardized images without environmental context was intended to isolate species recognition from habitat-based cues; however, this design may have influenced identification outcomes. Some participants may have been able to recognize certain species more easily in natural settings, where habitat, movement, size, and other contextual cues are available, whereas others may have relied primarily on morphological features in the image-based task.

In addition, the use of non-probability convenience sampling from a single Spanish region and one university limits the generalizability of the findings. Therefore, the results should be interpreted as context-specific evidence from Extremadura rather than as representative of all Primary Education pupils or prospective teachers. The study also did not include quantitative indicators of species abundance, individual media consumption, or encounter frequency, as the objective was not to model exposure effects but to document recognition patterns between Primary Education pupils and prospective teachers. Therefore, the study cannot determine the relative contribution of formal education, media exposure, direct encounters with wildlife, or other contextual factors to the observed recognition patterns. Furthermore, differences in naming precision criteria between na-

tive and exotic species reflect common educational conventions rather than equivalent taxonomic expectations. However, this asymmetry may have influenced the magnitude of the observed gap between native and exotic species recognition, since native animals required more specific identification than exotic animals. For this reason, the native–exotic comparison should be interpreted cautiously and understood as reflecting recognition under the pedagogical naming criteria used in this study. Similarly, although pupils had received the standard biodiversity-related content included in the Spanish Primary and Secondary Education curriculum, individual differences in prior exposure to biodiversity education, nature-based activities, or direct contact with local fauna were not assessed.

Future research could extend this work in several directions. First, intervention studies should evaluate whether educational activities specifically designed around locally relevant fauna—such as field-based learning, species identification workshops, or citizen science projects—lead to sustained improvements in species recognition and broader biodiversity knowledge. Second, future studies could examine the relative influence of formal education, media exposure, and direct experiences in nature on species recognition by incorporating individual measures of these variables. Finally, comparative studies across different regions or countries would help determine whether the recognition patterns observed in Extremadura are consistent across different ecological, cultural, and educational contexts.

Taken together, the findings highlight the importance of strengthening familiarity with locally relevant fauna within educational contexts, especially during teacher preparation, as part of broader efforts to support biodiversity education and awareness of regional biodiversity conservation.

Supplementary Materials: The following supporting information can be downloaded at: <https://www.mdpi.com/article/10.3390/conservation6030084/s1>. Table S1. Chi-square tests and effect sizes for differences in species recognition between Primary pupils and prospective teachers.

Author Contributions: Conceptualization, I.C.-C. and A.N.-F.; methodology, I.C.-C. and A.N.-F.; software, I.C.-C., A.N.-F. and A.M.-L.; validation, A.M.-L.; formal analysis, I.C.-C., A.N.-F. and A.M.-L.; investigation, I.C.-C. and A.N.-F.; resources, I.C.-C. and A.N.-F.; data curation, I.C.-C. and A.N.-F.; writing—original draft preparation, I.C.-C. and A.N.-F.; writing—review and editing, A.M.-L.; supervision, A.M.-L.; project administration, I.C.-C.; funding acquisition, I.C.-C. All authors have read and agreed to the published version of the manuscript.

Funding: This work was supported by the MCIN/AEI/10.13039/501100011033 and ERDF/EU under Grant PID2024-156176OB-I00; Junta de Extremadura and European Regional Development Fund “A way to make Europe” under Grant GR24052; and Universidad de Extremadura-Proyectos de Innovación Docente under Grant 2025/2026-LP4-n°53.

Institutional Review Board Statement: The study was conducted in accordance with the Declaration of Helsinki and approved by the University of Extremadura Ethics and Biosafety Committee (protocol code 154/2023 and date of approval 27 November 2023).

Informed Consent Statement: Informed consent was obtained from all subjects involved in the study.

Data Availability Statement: The data that supports the findings of this study are available from the authors, but restrictions apply to the availability of these data, which were used under license for the current study and so are not publicly available. The data are, however, available from the authors upon reasonable request and with the permission of University of Extremadura Bioethics Committee.

Conflicts of Interest: The authors declare no conflicts of interest.

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