Changes in Campus Bird Diversity of Qujing Normal University during Two Periods

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Abstract: From January to December 2009 (Phase 1) and from January to December 2024 (Phase 2), the survey methods of route and sample point were used to investigate the bird species at Qujing Normal University, analyzing their species composition and diversity. The results show that during Phases 1 and 2, the number of bird species on the campus of Qujing Normal University was 42 and 25, respectively. The families Picidae and Falconidae have disappeared, with only one bird species remaining in each family. The number of bird species decreased by 40.4%, and the dominant species shifted from White Wagtail, Common Magpie, Tree Sparrow, and House Swallow to Yellow-throated Bulbul, White-cheeked Laughingthrush, and Tree Sparrow.

Keywords: Qujing Normal University; Campus Birds; Autumn and Winter; Diversity Survey

Bird diversity plays an indispensable role in maintaining the balance of ecosystems. Some bird species are rare, and once their populations are damaged, they are difficult to recover. Therefore, studying bird diversity is a crucial indicator for assessing the ecological balance of a region, providing valuable first-hand data for wildlife conservation efforts. Birds are a vital part of the wildlife on university campuses and are highly sensitive to environmental changes. Investigating and studying the diversity of birds on university campuses can serve as a reference for campus bird protection and planning[1].

1. Methods

Qujing Normal University is situated in Qujing City, Yunnan Province, China. The university is located in the eastern part of Yunnan Province, characterized by a subtropical plateau monsoon climate, covering an area of 1267 acres. The campus features two artificial lakes, Donghu and Nanhu, and three gardens: Bolin, Shuolin, and Xuelin. The campus has distinct dry and wet seasons, with autumn and winter being the dry season, marked by scarce rainfall and ample sunshine. Qujing Normal University is home to 180 plant species, belonging to 68 families and 134 genera. The plants are categorized into three types: gymnosperms, dicotyledons, and monocots, with the dominant species being from the Rosaceae, Magnoliaceae, Fabaceae, and Asteraceae families[2].

Using the line transect method and bird call recognition, a 0.1 m Pus binocular telescope was employed. One person observed and reported the external features of the birds, while another recorded the observations. Digital cameras, video cameras, and recorders were also used for further observation and identification. The identification of bird species was based on the 'Chinese Field Guide to Birds' and other reference books. The survey was conducted during the peak activity period of birds, starting at 7:00 AM and ending before 11:00 AM. A 1-hour walk along the selected route (approximately 1 km) was conducted once daily, focusing on the periods when birds are more active, from 6:30 AM to 11:30 AM and from 5:00 PM to 7:00 PM. The residency type of birds was determined by referring to Zheng Zuoxin's' Comprehensive Catalogue of Chinese Bird Species and Subspecies, " Field Practice Manual for Chinese Birds, 'and' Chinese Animal Geography'.

2. Results

The results show that in the first phase, there were 42 bird species on the campus of Qujing Normal University, belonging to 8 orders and 23 families. Among these, 22 species belonged to the Passeriformes order, accounting for 52.4%, while 20 species belonged to other orders, making up 47.6%. There were 38 resident birds, 2 summer migrants, and 1 winter migrant or passage bird. In the second phase, the number of bird species on the campus of Qujing Normal University decreased to 25, belonging to 6 orders and 25 families. Of these, 16 species belonged to the Passeriformes order, accounting for 64%, while 9 species belonged to other orders, making up 36%. The number of summer migrants was 1, and the rest were resident birds. Compared to the first phase, the Picidae and Falconidae families disappeared, with only one bird species in each family. The number of bird species decreased by 40.4%, and the dominant species shifted from the White Wagtail, Common Magpie, Tree Sparrow, and House Swallow to the Yellow-billed Bulbul, White-cheeked Laughingthrush, and Tree Sparrow. In the first phase, there was only one nationally protected animal, the Red-footed Falcon, on the campus, but this species was absent in the second phase (Tab.1).

Table 1. Bird List of Qujing Normal University Campus in 2009 and 2024

Order	Family	Species	2009	2024	Residence type	Quantity
1. Piciformes	1. Picidae	1. Dendrocopos major	√		R	+
		2. Picus canus	√		R	+
		3. Blythipicus pyrrhotis	√		R	+
2. Bucerotiformes	2. Upupidae	4. Upupa epops	√	√	R	+
3. Coraciiformes	3. Coraciidae	5. Coracias benghalensis	√		R	+
	4. Alcedinidae	6. Alcedo atthis	√	√	R	+
4. Columbiformes	5. Columbidae	7. Columba livia	√		R	+++
		8. Streptopelia orientalis	√		R	+++
		9. Streptopelia decaocto	√	√	R	+++
		10. Streptopelia chinensis	√	√	R	+++
		11. Streptopelia turtur		√	R	+
5. Falconiformes	6. Falconidae	12. Falco tinnunculus	√		M	+
6. Podicipediformes	7. Podicipedidae	13. Tachybaptus ruficollis	√	√	R	++
7. Ciconiiformes	8. Ardeidae	14. Egretta garzetta	√	√	R	+
		15. Ardea cinerea	√	√	R	+
		16. Butorides striatus	√		R	+
		17. Nycticorax nycticorax		√	R	+
8. Passeriformes	9. Laniidae	18. Lanius cristatus	√	√	R	+++
		19. Lanius schach	√	√	R	+++
	10. Corvidae	20. Pica pica	√	√	R	++
		21. Urocissa erythrorhyncha	√		R	+
	11. Muscicapidae	22. Copsychus saularis	√	√	R	+++
		23. Saxicola torquata	√		R	++
	12. Sturnidae	24. Acridotheres cristatellus	√	√	R	+++
	13. Paridae	25. Parus major	√		R	+
		26. Parus rubidiventris	√		R	+
		27. Parus spilonotus	√		R	++
	14. Hirundinidae	28. Hirundo rustica	√	√	S	+++
	15. Pycnonotidae	29. Pycnonotus xanthorrhous	√	√	R	+++
		30. Pycnonotus sinensis	√	√	R	+
		31. Pycnonotus aurigaster	√	√	R	++

		32. Pycnonotus cafer	√	√	R	++
		33. Pycnonotus flavescens	√		R	+
	16. Sylviidae	34. Phylloscopus affinis	√		R	+
	17. Timaliidae	35. Garrulax perspicillatus	√		R	+
		36. Garrulax chinensis	√		R	+
		37. Garrulax canorus		√	R	+
		38. Garrulax sannio		√	R	+
	18. Passeridae	39. Passer montanus	√	√	R	+++
	19. Motacillidae	40. Motacilla alba	√	√	R	+++
		41. Dendronanthus indicus	√		R	+
		42. Motacilla flava	√		R	+++
		43. Motacilla cinerea		√	R	+
	20. Fringillidae	44. Eophona migratoria	√		W	+
	21. Campephagidae	45. Pericrocotus ethologus	√		R	+
	22. Dicruridae	46. Dicrurus macrocercus	√		S	+++
	23. Turdidae	47. Zoothera sibirica	√	√	R	+++

Note: M: migrant bird; R: resident bird; W: wintering birds; S: summer resident bird; +++represents dominant species (≥ 5 individuals/km),++represents common species (5-1 individuals/km),+represents rare species (≤ 1 individuals/km)

3. Discussion

The main reasons for the high number of bird species on the campus of Qujing Normal University in the first phase are: In 2009, when Qujing Normal University was established, the school placed a strong emphasis on greening. The campus boasts a beautiful environment with a high vegetation coverage and a diverse range of plant species, providing excellent habitats and safe havens for birds. Additionally, the young shoots, seeds, petals, fruits, parasites, and young leaves of various plants within the campus serve as abundant food sources for numerous wild bird species. The faculty, staff, and students have a high level of awareness and a strong love for birds, fostering a harmonious relationship between birds and humans. The university has also intensified its efforts to promote bird protection, enhancing public awareness of bird conservation. In the first phase, the campus is predominantly covered by woody plants, which provide a habitat for birds. Some of these plants also offer essential food for birds, creating an ideal environment for their survival.

In recent years, the number of students enrolled in schools has been increasing, leading to significant human interference with the campus environment. Compared to the findings of the first phase, the second phase survey revealed a noticeable decrease in the variety and number of bird species on the campus of Qujing Normal University. The reasons for this decline may include an increase in campus buildings and the number of students, which have had a negative impact on the survival of campus birds[1], such as the disappearance of birds like the peregrine falcon, which require large living spaces. The construction of infrastructure within the campus and the surrounding areas, including roads and buildings, has led to the destruction of some vegetation and green spaces, and the gradual disappearance of natural wetlands, which have damaged the habitats and environments of birds. For example, as campus facilities improved, dead trees disappeared, depriving woodpeckers of their feeding grounds, leading to their disappearance from the campus. Additionally, the school introduced black swans for ornamental purposes, but due to their rapid population growth and strong territorial behavior, the only water bird in the first phase artificial lake, the little 鸊鹈, also disappeared. Although the number of bird species has decreased in the second phase, the populations of advantageous species such as the white-cheeked laughingthrush, yellow-billed bulbul, and tree sparrow have increased. With

the overall improvement in ecological protection awareness among teachers and students and the enhanced love and protection of birds, there is now more conscious effort to protect birds, leading to an increase in the number of bird species that are close to humans. As the number of students increases, food sources such as leftover rice have also increased, further contributing to the growth of these non-human-threatening bird species.

Due to the limited area of the campus and the carrying capacity of the ecosystem, it cannot support a large number of birds, leading some birds to make only brief stops here. In particular, a significant proportion of these birds are fish-eaters that feed on fish in the artificial lake at the school. Additionally, climatic conditions also influence bird behavior. In both the first and second phases, most of the bird species at Qujing Normal University are resident birds. This is likely due to the university's predominantly subtropical plateau monsoon climate, with distinct dry and wet seasons and relatively warm winters. The abundant water sources in the artificial lake further contribute to this trend. Migratory birds are rare, indicating that increased human activity affects the habitat choices of migratory birds.

In summary, birds are highly sensitive to changes in their environment and communities, making them indicators of environmental quality. Therefore, bird diversity is a key indicator of the quality of campus environments. To enhance and protect the diversity of campus birds, the following suggestions are proposed: increase green space and reduce unreasonable land use. Choose fruit trees with lush branches and abundant fruits to provide food for birds. When pruning gardens, avoid the breeding season of birds. If nests are found, set up warning signs to alert people. Avoid damaging the original habitats of birds. In areas where birds frequently move, place warning signs to remind people to lower their noise levels.

Acknowledgments

This article is supported by the third batch of school level first-class courses of Qujing Normal University: Virtual Simulation Experiment on Building a Biosafety Concept Based on Bird Observation under the Background of Dual Carbon (Grant No. YLKC202423) and the 2025 Qujing Normal University School level Industry Education Integration Reform Project: Building a Knowledge Graph System for Animal Biology Experimental Courses Driven by Industry Education Integration (Grant No. 2025CJRH10)

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