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Developing bird watching ecotourism combined with education and natural conservation

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Abstract. Bird watching ecotourism is highly-responsible and educative kind of nature tourism which helps conserve natural environment and culture values of the local area, develop community and bring about remarkable economic benefits. Birds are seen everywhere but especially found with many species in nature reserves and national parks. There are 30 National Parks, 67 Nature Reserves, more than 50 Bird Sanctuaries in Vietnam, and more 16 Marine Protected Area are planned to be established until 2015, which has great potentials to develop bird watching ecotourism. In order to develop this tourism model in nature reserve, it is necessary to improve personnel's capability and to set up database for identifying wild birds in each area. Conserving precious and specific bird species, characteristic communities for habitats plays an important role in attracting tourists to Vietnam for bird watching. Some database in analyzing bioacoustics in some specific wind season tropical forests in Vietnam are presented in this paper such as Orange-bellied leafbird, Silver-eared mesia and Indian cuckoo.

Keywords: ecotourism, bird watching, nature reserve, bioacoustics.

1. Introduction

Being located in the tropical region, having a great variety of typical sceneries and ecological systems, with a culture rich in ethnical identities of the 54 fraternal groups, Vietnam has a great potential for the development of tourism in general and ecotourism in particular[1]. By far, a large number of natural resources for tourism, such as the National Parks (NP), Nature Reserve (NR), aquatic/marine conservation areas,… have been put to use for development of tourism, in which bird watching travel is included.

Thanks to its favourable topographical and climatic conditions, Vietnam enjoys largely varied regional fauna of 880 known bird species, which includes 6 new species that have been recently described and announced [2]. The ratio of endemic bird species in the country surpasses that of the Indochina peninsula and Thailand. Vietnam is considered as the native land of species of pheasant, with up to 3 endemic bird areas (EBA) and 63 areas for important birds areas (IBA). By 1995 alone, the total specified and endemic species in the country was 100[3].

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Within the strategy for protection of its natural resources and preservation of biological varieties, the Government of Vietnam has made a number of decisions to establish a system for natural preservation. By far, in the country there are 30 national parks, 67 nature reserve, and 16 tentative marine conservation areas by 2015. In addition, in the country, there are around over 50 birds' sanctuaries throughout the country, which are mainly located in the Mekong River Delta where numerous water birds come for colony nesting during their breeding seasons. Initially, the task of biological inventory appraisal has been started, including inventory of bird species in those preservation areas. One of the functions and duties of these natural preservation areas is to provide services to visiting tourists in conjunction with educational services regarding environmental protection and biological conservation on the basis of raising community awareness. Out of the patterns of ecotourism activities in preservation areas, the bird watching travel, especially of the endemic and typical species, receives the most attention from tourists in and out of the country. However, by now, such factors as infrastructure, personnel and service content have not been able to meet the requirements of the task. In this study, we would like to analyze the current status and put forward a number of solutions that are feasible for development of ecotourism in Vietnam, with an aim to bring the nature closer to the humans.

2. Study methodology

The research methodology to be applied here is a mixed approach between ecological method and geographical approach. The statistical approach is applied on the basis of existing data. The world-wide bioacoustics approach is also used here. In this method, sounds made by birds were recorded with professional parabole uni-directional microphones, Telinga PRO-4PIP made in Sweden, connected synchronously with Sony Recorder ICD-UX200F made in Japan. The accomplished files were taken to the laboratory for analysis based on the software of Raven Pro 1.4 developed by the Cornell Programme for Bioacoustics Research from Cornell University, the United States.

3. Reserch results and discussions

3.1. Diversity of birds in natural preservation areas

In Vietnam, the task of preservation of biological diversity was started as far back as the 1960s (when Cuc Phuong National Park was established on July 7th 1962). So far, the Government has made decisions to establish 128 such national preservation areas, of which 30 are National Parks. These areas have high biological diversity, and still retain many natural primitive features with numerous rare animal species having high values of genetic preservation. The findings of studies conducted on composition of many bird species in national parks show that 10 national parks in the country have the most of bird species, with the Cat Tien National Park being number one (see table 1). This is also the second area being recognized by UNESCO as an international biosphere reservation out of the 8 Vietnamese biospheres. In recent years, the 6 bird species that have been newly detected, described and announced scientifically are all observed in the national natural preservation areas. With geographical classification of birds in Vietnam, by Vo Quy, Nguyen Cu (1995)[4] there are 6 regions. The regional fauna of birds in each region has its own characteristics of the indicated birds.

Table 1. The ten national parks with the most recorded birds in Vietnam

No.	Name of National Parks	Number of species	Number of families	Number of orders	Red Data Book of Vietnam, 2007
1	Cat Tien [5]	348	64	18	16
2	Bach Ma [5]	328	53	15	13
3	Pu Mat [5]	323	49	15	14
4	Hoang Lien - Sapa [5]	301	48	14	7
5	Tam Dao [5]	286	44	14	6
6	Chu Mom Ray [5]	275	57	17	13
7	Vu Quang [5]	272	51	15	13
8	Cuc Phuong [5]	262	52	16	5
9	Xuan Son [6]	257	55	18	7
10	Phong Nha - Ke Bang [5]	255	55	18	15

Bird watching travel in ecotourism has started and is being now developed. At the beginning, a large number of tourists have been attracted to visit the parks, such as Cat Tien National Park, Cuc Phuong National Park, Bach ma National Park, and Xuan Thuy National Park … A number of the national park staff who are experienced in bird watching (example, Mr. Truong Cam, at Bach Ma National Park, is able to blow whistles to communicate with birds) has been able to assist tourists in approaching birds, listening to and watching them thus exploring as many interesting things about wild birds as possible. A number of national park have been able to make and publish lists of birds with illustrational photos of rare bird species to help tourists visiting Cat Tien, Cuc Phuong, Xuan Thuy, Tram Chim Dong Thap… However, most natural preservation areas in the country do not have sufficient data at the service of tourists observing birds.

The regional fauna in each preservation area should offer many interesting factual things for tourists to find. To this end, there should be staff who have received training on and be knowledgeable about the avifauna and their habitats, such as those birds feeding themselves actively early in the morning, at sun rise or before sunset; birds that breed by season, and usually making their nests in Spring when climatic conditions are favourable and it is warm enough. In case, there are only two seasons, insect-eating birds breed in early rainy season, while flesh-eating birds breed in mid-dry season when dry leaves fall and it is easy for them to find preys, but fruit-eating birds do breeding in late rainy season when there are a lot fruits available. Birds often do moulting once a year, usually after the reproduction period. A number of birds do an additional moulting before the reproduction period so that they can show off their new coats of feather or wear marriage coats. There are differences between males and females in a species with regard to their feather colours, their twittering and typical habitats. Many bird species migrate by season beside others being often found in

narrow distributions. Migrating birds are often water birds, flesh-eating birds, some species in the families of Sylviidae, Sturnidae, Muscicapidae, Motacillidae… Some bird species migrate on certain routes which often start in the North and end in the South. In order to make observations of birds, apart from their own knowledge and experience, bird watchers should be assisted with necessary equipment or instruments. There are birds in all the 128 preservation areas in Vietnam. In order to attract tourists, these preservation areas, therefore, should be able to select the typical characteristics of their regional fauna of birds so that they can meet the needs of tourists visiting their areas and at the same time to conduct the educational activities and raise the community awareness.

3.2. Tourists' needs in bird watching

There are different types of tourists visiting preservation areas and their aims also differ. Some can be researchers aiming at doing surveys or research into issues of attention. Others can be simply tourists who look for relaxation getting closer to the nature and getting to know more about the wild life. No matter who and what they are, upon leaving the places they have visited, all tourists should have a better understanding about the values of the natural environment, the regional ecological characteristics and the native cultural and historical values.

As for the typical bird watching tourists, they all aim at observing the typical features of birds and recognize bird species and their habitats in natural environments. To satisfy their needs, professional guides should be able to provide tourists with appropriate guidance or instructions on bird watching. Different bird species can be recognized in different ways.

The first thing first should be the overall background of the regional fauna of birds in the preservation area. Tourists should be equipped with the basic information on the regional fauna of birds through various channels of communication, such as introduction, video shows, photo galleries or sample displays … The next step should be how to approach birds in the nature. Tourists then should be given with safety precautions so that they can avoid snake bites, leeches or harmful insects… In most cases, tourists get hold of personal equipment and instruments for bird watching, but in case of necessity, preservation areas should be able to provide them with additional instruments such as telescopes to zoom, especially when watching water birds or flesh-eating birds.

For recognizing bird species in the nature, one can make direct observations on birds, listen to their twittering or songs, or base on such findings as feathers, droppings, footprints, nests, or any signs left by birds on foods … However, the two main ways of bird recognition include direct observation and identification of their typical twittering or songs.

The typical feature of birds is that their bodies are covered with feathers; the fore limbs have evolved into wings to adapt themselves to the nature of flights. It is very common that birds can notice us before we can notice them. Furthermore, birds seldom sit in a place for long for us to observe. For this reason, the observer should be able to grasp the recognizable features typical to each bird group and the basic signs to distinguish different bird species in a bird group. Guides should be able to tell tourists about recognizing ways based on bird sizes and shapes in flight, flying manner, ways to look for preys, differences of feathers between the male and female birds, even

reproduction period and the intervals between reproduction seasons. It is a matter of course that no one can recall all the features of an observed bird species in a shortest possible time. Therefore, tourists should be given instructions or guidance on outlining the morphological features of certain observed bird species with focal points or notes.

One requirement of ecotourism is to keep tourists exploring and to avoid unspired of long repetition of activities. There should be a variety of ways to look for clues and signs to demonstrate the presence of certain bird species in the absence of direct observations. For example, it is possible to collect bird feathers, bird egg shells, clots of bird droppings, signs of beak picking left on fruits or tree trunks. It is even possible to look for bird foot prints left on land/soil so as to make possible plaster moulds for further analysis or simply for use as souvenirs.

However, in backgrounds of forests or jungles, the majority of bird species can be possibly recognized with their typical twittering or songs. Unlike other groups of animals, the vocal organs of birds is the syrinx where the trachea is divided into two canals. It is with the morphological diversity of syrinx, size and shapes of canals, beaks, tongues .. that there is such a great variety of birds' twittering and songs. Moreover, some bird species can even imitate other tones and sounds through their life and development. In order to recognize birds' twittering and songs, it is necessary for observers to cumulate experience over a long period of time. As for tourists, they do need to be provided with such experience. This can be done through direct descriptions made by instructors/guides or through sample recordings on discs and tapes. The natural preservation areas in Vietnam have insufficient conditions to meet these two needs of tourists visiting them. So far, none of such discs or tapes for recognizing bird songs have ever been made in Vietnam for such purposes.

Another need of tourists is how to attract birds to get closer to them. There are a number of ways to guide them to do so. One is to make a box or tray that contains food, or a bathing pool while at the same time playing a disc of bird songs to attract birds to come closer to watchers. The other way is to make an artificial nest to be placed on an appropriate tree branch in the nature so that birds can collect waste sticks and leaves for nest making …

3.3. Orientations for developing patterns of bird watching ecotourism in natural preservation areas in Vietnam

Although birds are found everywhere, not all the natural preservation areas in Vietnam can develop bird watching ecotourism. To develop this type of tourism, natural preservation areas should have necessary natural and infrastructure conditions and human resources needed. Some favourable conditions for developing bird watching ecotourism include:

- Existence of rare and endemic bird species.

- Presence of some bird species in massive quantity for easy observation.

- Annual stopovers of migrating flocks of water birds or flesh-eating birds …

- Diversity of birds in a variety of typical biological environments in the region …

In addition, consideration should be taken of important supportive conditions for development of this type of tourism. Those include beautiful sceneries, attractive spots, together with diversity and typical and unique values of native culture that is representative to

the region. Infrastructural conditions and quality of services make up the two key factors for development of ecotourism including bird watching tourism.

In the near future, the following points should be focused for those natural preservation areas with advantageous conditions:

- There should be investment in building a line for bird observation and building supplementary appropriate watch-towers.

- Database should be established with bird lists, bird illustrative pictures, bird twittering and song discs, bird biological and ecological features, especially those belonging to the specific birds observed in the fixed line in the preservation areas.

- Necessary equipment and instruments should be provided for bird watching and tourist guidance.

- Training courses should be organized for staff involved in providing guidance for tourists in bird watching and involving local experienced community people to take part in this activity so that benefits can be shared with the community.

- Proper investment should be made in popularizing this type of ecotourism through different communication channels.

- Exploitation should be made of values of other native natural and historic places so as to increase the diversity and attraction of bird watching ecotourism in the region.

- Coordination and collaboration efforts should be made with schools, social organizations, professional agencies so as to attract more community to visit, study and raise the community awareness and change behaviour in friendly interaction with environment.

- Basic principles of ecotourism should be ensured. Particular attention should be emphasized on the natural environment, typical ecological system and the variety of bird species. Degradation of environment and deterioration of ecological diversity means the decreace of this type of tourism.

Bird watching ecotourism combined with education and conservation of nature has been a pattern that has been existing in a large number of developed countries but is still new to Vietnam. To develop it, it is necessary that there should be attention paid by the management boards at natural preservation areas, support and assistance given by different branches, organizations in and out of the country, of scientists and responses by community.

3.4. Some biological data on 3 typical bird species in Vietnam's tropical forests

In order to contribute to the step by step building the bioaccoustique database for recognition of bird twittering and songs in Vietnam, we have conducted the recording and analysis of twittering and songs of some bird species common in natural preservation areas in our country. In this part, we would like to put forward as an exemplification of bioaccoustique features of 3 typical birds that are familiar in the monsoon tropical are of Xuan Son National Park, in Phu Tho province, namely: *Chloropsis hardwickii*, *Leiothrix argentauris* and *Cuculus micropterus*.

+ *Chloropsis hardwickii* Jardine et Selby, 1830. Body lengt: 20cm. It has the resident bird, belonging to Chloropseidae family, order of Passeriformes. The outward colour is conspicuous green, the male bird often differs from the female one with its lilac green colour that is located below the chin, below the eye,

stretching to the chest and along the edge of the two wings; the belly is dark brown. Meanwhile, the female belly has the colour of yellowish green.

Our recordings and song spectrogram analysis show that this bird's twittering has 9 notes ranging with length of 2,34s (figure 1). The eighth note has the shortest length of 0,11s and the sixth note has the longest length of 0,26s. The notes have the frequency fluctuating from 5,6 to 1,9 kHz. The first note (f: 2,9-4,6 kHz) and the second one (f: 1,9-3,1 kHz) slide up, while the rest of sounds slide down, the third note is the highest and slide down (f: 5,8 - 3,1 kHz). The ending notes tend to be faster.

It can be noticed that in the twittering of a number of birds having large frequency, the intervals of notes are relatively short and are therefore sliding together, thus making clear sound with high pitch and harmonic. The twittering with initial sounds sliding up and the late sounds sliding down is typical of this bird species. This species is also able to imitate the twittering of other bird species in the region.

+ *Leiothrix argentauris* (Hodgson, 1837). Body length: 18cm. This species is resident, belonging to the Timaliidae family of Passeriformes. In nature, they live in small flocks and are often caught as ornamental birds because of their conspicuous feather coats and interesting songs. This species is morphologically similar to Red-billed Leiothrix (*Leiothrix lutea*) but different in that its peak is yellow, its head is black and ear is silver white. The female is differentiated from the male one with its red upper tail coverts instead of being dark orange colour.

Their songs often have 6 notes with length of 1,45s (figure 2). The length of three initial notes is short (0,14s), the 3 ending notes have longer length (0,18s at the fifth note and 0,22s at the sixth note). The notes have the frequency fluctuating from f: 1,6 - 3,2 kHz. Each note has gradual increace of frequency at the beginning of the song and decreace at the ending notes. The variation of frequency decreases gradually with each note, i.e. at the first note f: 1,9-3,2-1,6 kHz, at the fourth note, f: 2,0-2,8-1,8 kHz.

The continuous variation of frequency forms a piece of twittering music in its songs.

+ *Cuculus micropterus* Gould, 1837. Body length: 33cm. This species is resident, belonging to the family of Cuculidae of Cuculiformes. This species has a habitat of laying its eggs in the nests made by other bird species like drongos or broadbill. The morphological typical feature is that its wing and back is brown in contrast with its grey head. On the lower part of its body, there are black and grey lines interwoven with each other, each line has brown edges in the white background. Its eyes and legs are yellow. The female bird is differentiated from the male one with her lower body of light brown colour.

Songs of this species are rather familiar, with four key notes, and with length of 0.87s (figure 3). The first note is the shortest (0,08s), the second and third notes have average length (0,10s). The first three notes are the highest and loudest (f: 1,9 kHz - 1,1 kHz), the fourth note is lower and prolonged (f: 1,8 kHz - 1,0 kHz). Its song is repeated with higher pitch in later repetitions. The notes in its songs are typical and easy to recognize due to duplication of the musical scale in its Vietnamese name of *bắt-cô-trói-cột*\. Individuals in this species in forests are not many, but due to its echoed songs and continuous repetition, it is possible to notice it any time during reproduction season.

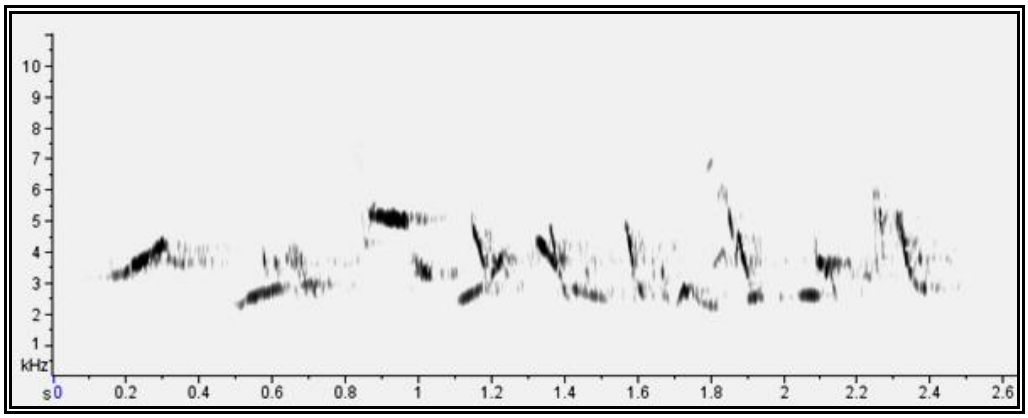

Figure 1. Spectrogram of the *Chloropsis hardwickii songs.*

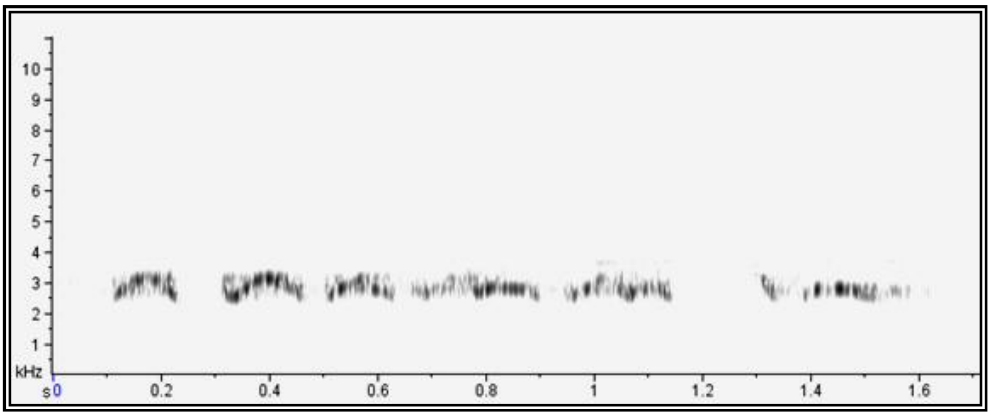

Figure 2. Spectrogram of the *Leiothrix argentauris* songs.

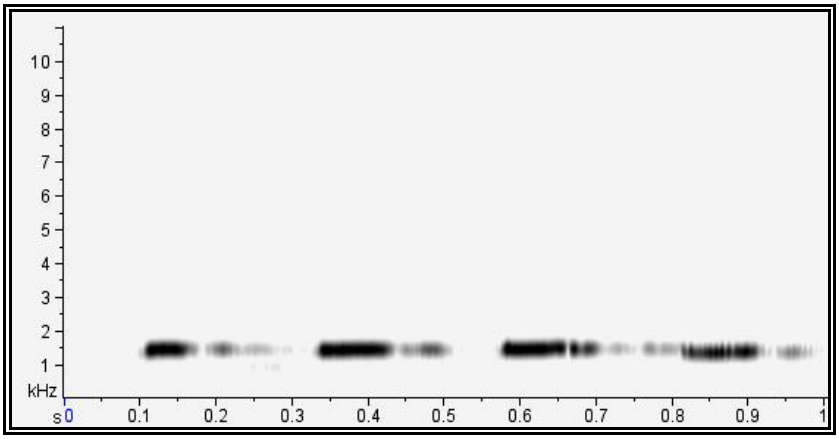

Figure 3. Spectrogram of *Cuculus micropterus* songs.

4. Conclusions

The development of the typical bird watching ecotourism can boost up the task of education in combination with natural conservation and contribute to local economic development.

In order to develop it in natural conservation areas, it should be ensured that avifauna be typical and attractive, infrastructure be adequate and involved staff be technically trained.

Bird watching ecotourism is typical and potential and has received attention to its development expressed in the Strategy for development of tourism in Vietnam. Yet, there have been some limitations in this aspect, due to the fact that this form is still new to Vietnam and accordingly there is a lack of awareness in terms of both theory and practice. It is, therefore, proposed hereby that different branches, sectors and organizations in and out of the country should give their supports and assistances so that pilot potential models of natural conservation areas can be set up. The management boards of natural preservation areas should make coordination efforts with scientists in making tourist guiding materials including bird photos, recordings of bird calls and songs and biological and ecological features in relation. There should be orientations for developing such natural preservation areas into laboratorial research sites for university and college students in the region.

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