

Project Report

**Population status of the Jankowski's bunting *Emberiza jankowskii*
in North East China**

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Photo credit: ZHU Lei

Report

1. Survey results

Population of Jankowski's bunting had experienced drastic decline during recent years, with distribution range shrank to mainly North East China. Study of its population status as well as habitat requirement is urgently needed. The present study aimed to obtain information of the current population status of Jankowski's bunting and its breeding habitat requirements at Tumuji and Keerqin in Inner Mongolia. Only 15 individuals were recorded during the two survey periods using transect-point count and playback of the bunting's song. All of these records were from Xiergen in Keerqin. Preferable breeding habitat of Jankowski's bunting was area with >90% grass coverage and >20cm in height; shrub coverage over 40% with height at 1m. Based on logistic regression analysis, the coverage of shrub and low grass had positive correlation with the presence of the bunting, but the coverage of high grass had negative correlation with the presence of the bunting. The territories were around one to two hectares, mainly located the slopes aside the valley, bordered with hill ridges. The very low sightings of the bunting recorded in the present study alarmed us the critical status of this species.

2. Study sites

The two study sites were those where sightings of Jankowski's bunting had been recorded in the past five years:

1. Tumuji National Nature Reserve, Inner Mongolia (N 46°04'~46°25' , E 122°44' ~ 123°10')
2. Keerqin National Nature Reserve, Inner Mongolia (N 44°51'~45°18' , E 121°41'~ 122°14')

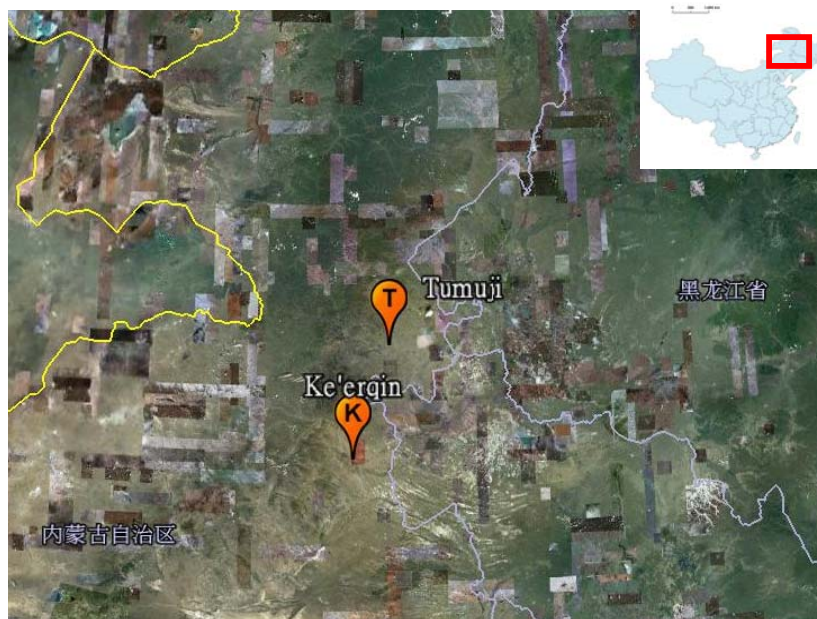


Fig. 1. Location of Tumuji (T) and Ke'erqin (K) National Nature Reserve. Yellow line is country border, white lines are province border.

3. Survey Periods

The project was divided into three stages:

- 16th – 17th April: Training of survey methods in Beijing (indoor and outdoor sections)
- 29th April – 3rd May: First survey
- 3rd June – 9th June: Second survey

4. Survey methods

4.1 Transect-point set and habitat measurement

Transect-point count was applied in this study, with playback of the bunting's song employed during the surveys to enhance detection rate of the bunting. We walked along the transect with speed at 1.5 km per hour. Survey points were set on the transect every 300 m to 500 m. We played back the song of Jankowski's bunting at each point for at least five minutes. Meanwhile, a survey area with radius of 50m was established every point,

for recording habitat characteristics. The measurement included: coverage of low grass (10-20 cm), high grass (> 30 cm) and shrub, height of vegetation and anthropogenic activities in the habitat (e.g. grazing, agriculture, grass-cutting and collection of fuel branches).

The first day of the study was used for choosing locations and setting up the transects, with helps from staffs of the nature reserves. Three transects with total length of 11.4km were set in Keerqin Youyi Zhongqi within Keerqin National Nature Reserve (Fig. 2) in both surveys; while in Tumuji Nature Reserve, three transects of total length of 17.1 km were set in the first survey, one more transect was added during the second survey (total length of 11.4 km)(Fig.3).



Fig. 2. Locations of the three transects in Keerqin Youyi Zhongqi of Keerqin National Nature Reserve (K01: Xiergen; K02: Xinjiamu; K03: Mengehan Shan).



Fig. 3. Locations of the four transects in Tumuji Nature Reserve (T01, T02, T03, T04).

4.2 Territory survey

After finding a pair of Jankowski's bunting, we played back the song around their territory and record the response of the male. Once the male stop to response the songs and flied back into territory, we recorded GPS coordinates of the last point where the male perched as the border point. At least four directions were repeated to generally mapped the territory of the pair.

4.3 Data analysis

The survey points were divided into two types: presence and absence of Jankowski's bunting, were treated as dependent variable. All of the habitats measurements were treated as independent variables. Transferred the coverage of low grass, high grass, shrub and bare land into category variables. $0\%=0$, $1-33\%=1$, $34-66\%=2$, $67-100\%=3$. Six types of anthropogenic activities (grazing, farming, grassing, burn, fenced and natural reserve) were also transferred into presence/absence variables. Correlation analysis was conduct to

detect the relationship between the independent variables. The coverage of bare land was excluded from the dataset because of significantly correlation with the coverage of low grass and shrub, burn and fencing. Logistic regression analysis was used to detect the effects of habitat variables to absence/presence of the bunting.

5. Results

5.1 Keerqin Youyi Zhongqi

5.1.1 Population survey

During the first survey, a total of 15 Jankowski's bunting were recorded (Table 1) in transect K01 in Xiergen (3.5 km) within a privately owned land of Siberian Apricot *Armeniaca sibirica* (area: 6.8 km²). These sighted buntings included six breeding pairs and three solitary individuals (two males and one female), with a population density of 2.22 individual/ km². Whereas there were no Jankowski's bunting were detected in both transect K02 in Xinjiamu and K03 in Mengehan Shan.



Fig. 4. A pair of Jankowski's bunting standing on branches of a shrub. (Photo: Zhu Lei)



Fig. 5. A Jankowski's bunting feeding in the bush. (Photo: Zhu Lei)

Table 1 Coordinates of Jankowski's buntings in Keerqin.

ID	Number and Sex	Coordinate
A	1 female and 1 male	N 44 59.833; E 121 19.974
B	1 female and 1 male	N 44 59.723; E 121 19.910
C	1 female and 1 male	N 44 59.939; E 121 19.783
D	1 female and 1 male	N 45 00.237; E 121 20.377
E	1 male	N 45 00.275; E 121 20.406
F	1 male	N 45 00.088; E 121 19.700
G	1 female and 1 male	N 45 00.122; E 121 20.335
H	1 female and 1 male	N 45 00.031; E 121 20.098
I	1 female	N 44 59.496; E 121 20.490

In the second survey, nine individuals were found. Six of them were territory-defending males, and thus showed typical response towards playback of song, including singing at branch, flying around the speaker. The territories occupied by the six males were at the same locations recorded during the first survey, thus they could be treated as the same ones

as last time. While females in these territories were not sighted, this may imply that they are breeding in nests. Two other females were sighted to pair up with two males respectively. Another male was found nonresponsive towards playback of the bunting's song, suggesting that it is a solitary individual or a sub-adult. According to staffs of the Nature Reserve, there were juveniles from 2 families (five and three individuals respectively) sighted three days before this survey, yet none of them but the nests were found during the survey. Possible reasons may due to predation or juveniles had left the nests.

5.1.2 Territory characters

The territories of Jankowski's bunting were mainly located at the slopes and the valley, bordered with hill ridges (Fig. 6), which area was around one to two hectares (Fig. 7).

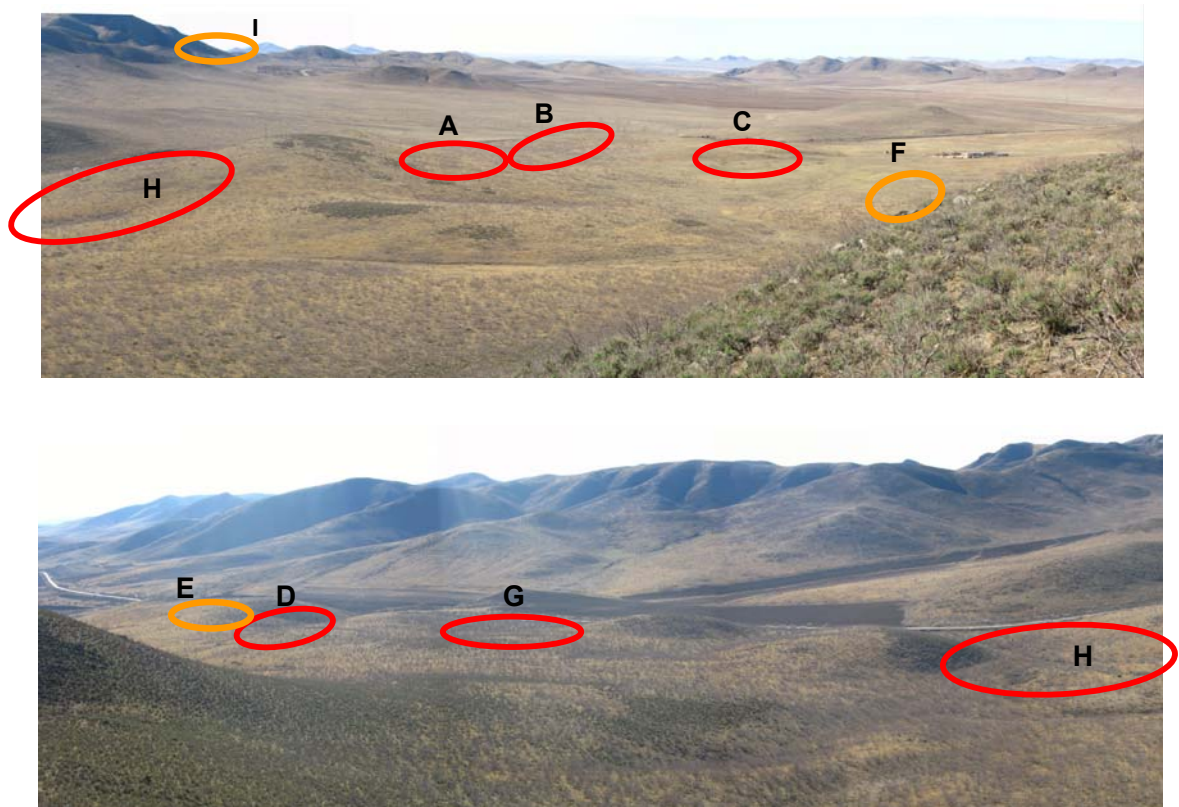


Fig. 6 The territories of pairs (red circles) and observing site of individuals (orange circles) in Xiergen.

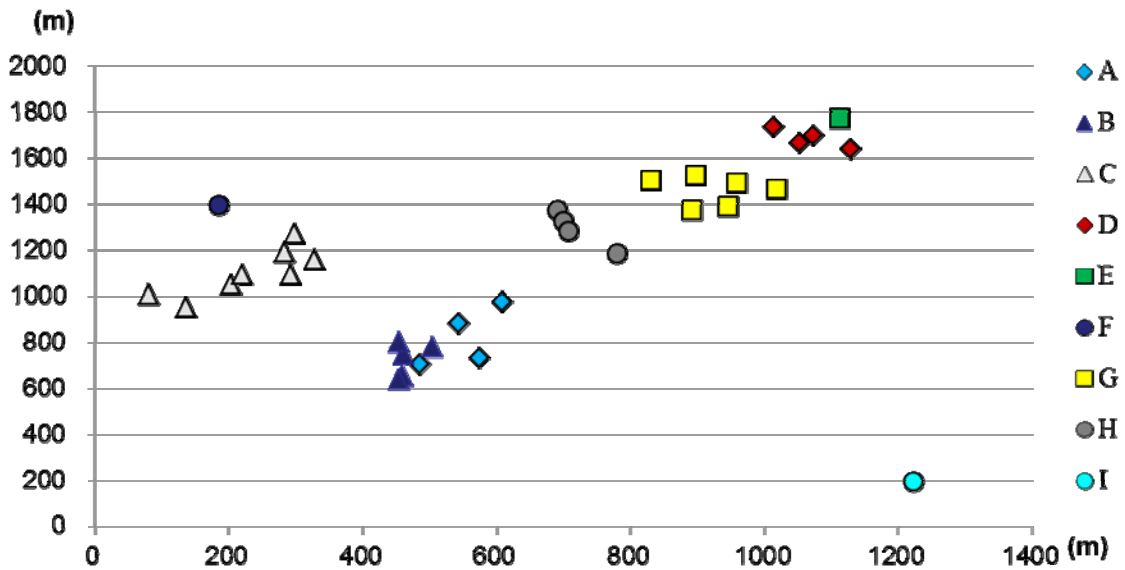


Fig. 7 Occurrence points of the Jankowski's buntings in Xiergen.

5.1.3 Habitat selection

At locations where Jankowski's bunting were sighted, grass covered 99% of the habitat, with an average height of 23cm; Shrubs covered 52% of the land, with height averaged at 96cm. 1% of the bunting's breeding habitat was bare ground. At locations where no buntings were detected, average height of grass was only 7.6cm, with habitat coverage of 73%, while average height of shrubs was 89cm, coverage of 34%. Percentage of bare ground reached 21%.

Based on information obtained from staffs of the Nature Reserve and local people, together with data collected in the present study, locations meeting the breeding habitat requirements of Jankowski's bunting (>90% grass coverage and >20cm in height; shrub coverage over 40% with height at 1m) in Keerqin Youyi Zhongqi restricted to Xiergen only. Therefore, population density of Jankowski's bunting in Keerqin Youyi Zhongqi (total area: 15617 km²) was estimated to be as low as 0.0009 individual/ km².

The coverage of shrub had marginally significant positive correlation with the presence of Jankowski's bunting ($B = 1.099$, $P = 0.072$), and the coverage of low grass also has

positive correlation with presence of the bunting ($B = 0.451$) but not significant ($P > 0.1$). Coverage of high grass showed negative correlation with presence of the bunting (Table 2).

Table 2 Logistic regression analysis between habitat variables and presence/absence of the buntings

Variables	B	S.E.	Wald's value	<i>P</i>
Coverage of low grass	0.451	0.606	0.554	0.457
Coverage of high grass	-0.981	0.864	1.290	0.256
Coverage of shrub	1.099	0.610	3.242	0.072
Grassing	-19.404	2.842E4	0.000	0.999
Burn	-19.124	1.496E4	0.000	0.999
Farming	-0.822	1.244	0.437	0.509
Fencing	-0.398	1.479	0.073	0.788
Grazing	0.394	1.378	0.082	0.775
Natural reserve	-1.271	1.768E4	0.000	0.799
Constant	.643	7.601	0.007	0.933



Fig. 8. Typical habitat of Jankowski's bunting at Keerqin Youyi Zhongqi (Photo: Dong Lu)

5.2 Tumuji Nature Reserve

No Jankowski's bunting were recorded during the two surveys. All of the four transects (only three transects in the first survey: T01-T03) were set in locations where the bunting was sighted in 2010 (according to the administrator of Tumuji National Natural Reserve): two individuals in T02, three in T03 and more than 5 in T01 and T04.

Results of habitat characteristics were in Tumuji Nature Reserve were: grass average height at 38.7cm, which was higher than that in Xiergen of Keerqin (23cm); Shrub covered only 20.2% of habitat, that was less than half as in Xiergen (53%); Bare ground coverage was 28.1%, compared to only 1% in Xiergen.

6. Conservation suggestion

Higher coverage of Siberian Apricot's shrub and low grass were related with the presence of Jankowski's bunting. The males always perched on the shrub to song to occupy the territory. And the apricot's shrub could provide good hiding places and nest protection to the buntings. Different grass height demonstrated opposite effects to the presence of the bunting, suggested effective management to maintain the grass height on a suitable height (15-20 cm). Too high grass may limit the activity of the buntings.

According to our survey results, fencing is a effective method to protect the habitat of Jankowski's bunting to avoid destroy from burning, farming and grazing. It is necessary to enforce the strict protection management in not only the presence site of the bunting (such as Xiergen) but also the highly potential habitats (such as Tumuji and Xinjiamu) to maintain the bunting's habitat needs. And it is urgent to find out wintering habitats of the bunting for better understanding their life history to make effective conservation policy.

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Group Photo



Photo of the research team and Mr. Yu, You-zhong, deputy secretary of Keerqin National Nature Reserve. (from the left: ZHU Lei, GUAN Xiang-yu, FU Jian-ping, YU You-zhong, DONG Lu, ZHANG Xiao, WU Lan)