

Nesting of the Chinese Bush Warbler (*Tribura tacsanowskia*, Sylviidae, Passeriforms) in the Amur Region

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Abstract—A nest of the Chinese bush warbler (*Tribura tacsanowskia*) has been found and monitored in the Amur region for the first time. This is a poorly studied species distributed in southeastern Siberia, the Russian Far East, and the adjoining areas of Mongolia and China. Only seven nests of this species were found earlier, all of them in the Trans-Baikal Territory. Descriptions of those findings are given, including the habitat, location and structure of nests, egg clutch and downy chick, and behavior of adult birds at their nest. The time contributions of the male and female spent in percent in the nest, as well as to chick feeding and the ejection of chicks' litter pellets have been calculated for the first time. The main parameters of nesting life have been revealed: daytime and nocturnal activity cycles of adult birds in the nest and daily graphs of nestling feeding hours. Observations of adult activity at the nesting site in the period of feeding the chicks in the nest and after their release from the nest are presented. Some other details of Chinese bush warbler behavior and nesting are presented.

Keywords: Chinese bush warbler, *Tribura tacsanowskia*, nesting site, nest, eggs, chicks, feeding, behavior, Trans-Baikal Territory, Muravyevskii Park, photo-trap, camcorder

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INTRODUCTION

The Chinese bush warbler (*Tribura tacsanowskia* Swinhoe 1871) is a narrow-range species of southeastern Siberia and the Far East, as well as the adjacent regions of Mongolia and China. Most likely, the Chinese bush warbler is little known due to its secretive way of life and specific vocalization. Its distribution, ecology, and nesting life have been studied poorly.

The species is listed in Appendix 1 of the Red Book of the Russian Federation (2001), in the Red Books of the Amur Region (2009), Khabarovsk Territory (2008), and the Trans-Baikal Territory (2012), and Chita oblast, as well as the Aginskii Buryat Autonomous District (2000). In the Jewish Autonomous oblast, the status of the species needs clarification (Averin, 2010). In the Primorye Territory, the Chinese bush warbler is not protected, since its nesting has not been revealed, and it is rarely encountered (Kurdyukov and Volkonskaya-Kurdyukova, 2013).

The information about the finds of nests that were made before us is brief, fragmentary, and is mostly represented by general notes. We give citations from all these sources.

The first mention of the breeding of the Chinese bush warbler was made in the work of Dybowski and Parrex in the bird catalog of the village of Darasun (the

Trans-Baikal Territory) and its environs for 1866 and 1867, where the authors limited themselves to a brief remark: "... the species is rare, adult birds have eggs, which are very similar to the European subspecies, but are smaller" (Dybowski and Parrex, 1868).

The report of Dybowski and Godlevskii (1870) to the Russian Geographical Society in 1869 included the Chinese bush warbler only in the general list of bird species, where it is mentioned in the "Dauria" column (the settlement of Darasun). It is included neither in the list of nesting species nor in the list of migratory species listed in this report.

Later, Tachanovskii (1872) published a brief description of the Chinese bush warbler breeding in the vicinity of the settlement of Darasun according to the observations of B.T. Dybowski. He writes: "... the species inhabits small dry mountain valleys, which are overgrown with tall grass and scanty shrubs."

"It is a fairly rare bird in Western Dauria and with the approach to Lake Baikal it is even rarer. The species inhabits dry small valleys overgrown with tall grasses and dense shrubs and expands up to the mountain peaks. Two nests that were found in the environs of the settlement of Darasun were hidden in grass thickets low to the ground. They consisted of dry grass stems, which were quite firmly and tightly knitted,

Table 1. Sizes of all eggs of Chinese bush warblers (*Tribura tacsanowskia*) that are known on the territory of Russia

Author of the find	Place and date of the find	Egg sizes (mm) presented by the authors of finds	Average egg size (mm) according to the measurement data in column 3	Notes
1	2	3	4	5
B.T. Dybowski (V.V. Godlevskii)	Karymskii region of the Trans-Baikal Territory, settlement of Darasun (Dauria). The date is not indicated	18.2 × 13.8, 17.4 × 14.0 and 18.5 × 14.0		Two clutches with five eggs in each of them were found. The egg sizes are not indicated anywhere. The data are reproduced as they are presented by the authors
A.S. Rozhkov, L.I. Malyshev	The southwestern shore of Lake Baikal (the valley of the Verkhnyaya Tibeltinka River), from 1954 to 1958, probably in 1956. The nest was found on June 20	18.6–19.0 × 13.1–13.5	18.8 × 13.3	There were 5 eggs in the nest on June 25
V.D. Sonin, S.I. Lipin	BASSR (Buryatia), Tunskinskii region, the environs of the village of Tagarkhai, July 10, 1966	18.9 × 14.1, 19.0 × 14.1, 19.3 × 13.9, 19.3 × 14.1, 19.5 × 14.0	19.2 × 14.04	Sizes of the eggs kept at the Zoological Museum of Moscow State University; the weight of the dry shell is given in brackets: 18.4 × 13.9 (0.10) 18.8 × 14.0 (0.09) 18.9 × 14.0 (0.09) 19.2 × 13.9 (0.09) 19.3 × 13.9 (0.09); the measurements were made by V.V. Grichik (personal communication)
V.D. Sonin, S.I. Lipin	BASSR (Buryatia), Tunskinskii region, the environs of the village of Tagarkhai, July 10, 1966	16.5 × 13.1, 17.1 × 13.1	16.8 × 13.1	The authors present the sizes of only two of five eggs
E.P. Sokolov	Aleksandrovo-Zavodskii region of the Trans-Baikal Territory, the environs of the villages of Sharo and Dono, June 22, 1983	17.4 × 13.4, 17.8 × 13.7, 18.3 × 13.7, 18.5 × 13.6, 19.0 × 13.8	18.2 × 13.6	There were five eggs in the nest on June 25
L.V. Kapitonova	The Amur region, Tambov district, Muravyevskii Park, June 28, 2016	18.9 × 13.1, 18.4 × 13.1, 18.1 × 13.2, 18.1 × 13.1, 17.6 × 13.0	18.2 × 13.1	

were carefully covered inside with thinner grass stems, without the presence of hair. The eggs, the number of which was five in each nest, were similar in shape and color to the eggs of our *Locustella Rayi*, but were slightly smaller. The background of the eggs is white matted, dotted with brick spots, which form a more or less wide whisk closer to the blunt end. Where variegated patterns are denser, there are also violet pale

spots, which are absent on the rest of the egg surface. Newly laid eggs have a light pink shade and are also similar to those of our *Locustella Rayi*." The dimensions of the eggs are given in Table 1.

"You can approach the incubating female closely, but if it flies away, it returns when you leave. Despite many visits and examinations, the birds do not leave their nests."

The same nests are described in more detail in Tachanovskii's book on avifauna of Eastern Siberia (1891–1893): “The nests, in contrast to *L. lanceolate*, are built from larger marsh grasses, which have the same size, except for the inner part, which is covered with thin grass stems. All of the nest structure includes no moss and shrub leaves, and if they are present in a small amount, it is accidental. The nest texture is rather thick, not dense, and translucent. The height of the nest is 5.5 cm; the outer diameter is 8.5–8 cm, the internal diameter is 6 cm, the depth of the nest is 4.5 cm.”

“The eggs are very similar to those of *Locustella Rayi* (the Eastern Grasshopper Warbler) from Europe and have almost the same dimensions. They have a white background, which seems a little pinkish due to being mottled. The mottles consist of spots of two color scales. The surface mottles are brownish red, located more or less densely over the entire surface, irregularly shaped and small. They are mixed with others, which are somewhat larger in size, are located below, have an ashy shade, and become visibly denser near the blunt end of the egg and more or less sparse on the rest of the surface. The speckled pattern of the blunt end is generally more intense than on the rest of the surface and often forms a wide ring (whisk). The shine is insignificant.” The dimensions of the eggs from the settlement of Darasun are given in Table 1.

“In late June, the birds build nests in grass near the ground and lay five eggs; incubating of eggs starts by mid-July. The female sits continuously in the nest and flies away only if someone passes by, and this is the only way to find a nest. It returns to the nest cautiously, on foot, and the male stays far away at this moment. By the end of July, the chicks grow up. In the middle of September, the birds leave their nesting areas (Godlevskii).” The dates of these two finds are not mentioned anywhere.

A third nest was found by E.P. Pavlov on July 4, 1939, in the valley of the upper reaches of the Chita River (the left bank, the mouth of the Sangikan River) in the Trans-Baikal Territory. The male and female were captured with a difference of several hours at the moment of leaving the nest, and the nest was collected. “There were five absolutely fresh eggs in the nest.” “The nest was located near a willow bush on the ground, in a small, apparently specially dug hollow, which was carefully covered on all sides with stems and leaves of last year's grass. It was quite difficult to notice this small nest, since it was hidden very well among dense tall grass. It was near the edge of a larch forest, on a small, somewhat swampy meadow, which was here and there overgrown with shrub birches and willows.” “It is not easy to get these little birds, although they fly from under your feet. They have to be shot in flight, since it is very difficult to notice warblers in dense grass” (Pavlov, 1948). The dimensions of the nest and eggs are not presented in the work.

In the sixth volume of the report “Birds of the Soviet Union” (Dementyev et al., 1954), the authors refer to the above descriptions of Tachanovskii (1891–1893) and Dybowski (without reference).¹

The fourth nest was found on the southwestern shore of Lake Baikal by Rozhkov and Malyshev (1960). The authors worked in this area from 1954 to 1958, mainly in 1956. The Chinese bush warbler was encountered near the settlement of Listvyanka on June 13. The description of the behavior of the birds is specific: “The birds were in the grass, two or three together. They let us approach to a distance of up to one step, then they flew away to a few meters and, like mice, quickly ran away on the ground. The Chinese bush warblers did not sit down on the nearby trees. Apparently, they were divided into pairs.”

In the valley of the Upper Tibeitinka River (a right tributary of the Irkut River) “an almost formed egg of a captured female was found on June 17. A nest with one egg was found on June 20. It was at the edge of a birch forest in boggy shrub thickets, between stems of bases of a willow-leaved spiraea bush, so that the bottom of the nest was barely touching the ground. The nest was very loose, made of last year's grass. It kept its shape due to being surrounded with stems of willow-leaved spiraea and large grasses. The bottom was covered with thinner grass. The outer diameter of the nest was 85 mm, the inner diameter was 60 mm, the height of the nest was 45 mm, and the depth was 33 mm. The observations established that the female laid one egg a day. The complete clutch consisted of five eggs.” The dimensions are given in Table 1. “The shell is slightly shiny, white, has small brownish-fulvous speckles and fewer gray–violet blurry spots; some eggs had one or two dark-brown curls at the blunt end. Speckles and spots are located more densely at the blunt end and form a whisk or a solid dark spot here.”

The fifth and sixth nests were found on July 10, 1966, in the Tunkinskii region of the Buryat ASSR, in the vicinity of the village of Tagarhai. “... One egg was found in a birch forest, and another was encountered in pine undergrowth. Both nests were built on the ground under spiraea bushes. The dimensions of the nests were as follows (cm): 12.0 × 17.0 and 8.0 × 10.0, the diameter of the nests was 5.5 × 8.0 and 5.5 × 6.0, the depth of the nests was 4.5 and 3.8, the height above the ground was 6.0 and 4.0. There were five eggs in both nests” (Sonin and Lipin, 1969). The dimensions of the eggs are given in Table 1. At present one of these nests with a clutch of five eggs is kept at the Zoological Museum of Moscow State University in A.P. Kuzya-kin's collection; the nest was collected by V.D. Sonin.

¹ Interestingly, Pavlov's data (1948) are not included in the chapter devoted to the Chinese bush warbler in the sixth volume of the synopsis “Birds of the Soviet Union” (Dementyev et al., 1954), although references to this work are present in essays devoted to other species.

Table 2. Date, time of day, and type of surveys of the nest of Chinese bush warblers (*Tribura taesanowskia*) (Muravyevskii Park, Amur region)

Date	Time of day	Type of surveys	Notes
July 10–11	19:05:18–19:38:39	Photo-trap	–
July 11–12	20:07:25–12:01:11	Photo-trap	–
July 12–13	12:19:51–12:02:22	Photo-trap	–
July 13	12:30–13:30	Video camera	–
July 13–14	13:54:42–07:48:29	Photo-trap	–
July 14	08:30–09:30, 09:40–10:40	Video camera	–
July 14–15	11:00:12–10:01:51	Photo-trap	The quality of this survey period is not satisfactory due to strong wind and waving of grass before the camcorder
July 15–16	10:38:24–11:41:11	Photo-trap	The same factor

The seventh nest was found by E.P. Sokolov in 1983 in the southeastern Trans-Baikal Territory, on the southeastern slope of the Nerchinskii Range, in the vicinity of the villages of Sharo and Dono (Sokolov, 2013). This case of the Chinese bush warbler nesting in the Trans-Baikal Territory was described in the most detail. The nest and eggs were measured (Table 1), and their color was described. The hatching of the chicks was traced; their description was given at the age of 1, 2, 3, 4, 5, 8, 9, and 10 days. The behavior of adult birds near the nest and some other aspects of breeding were described. However, there are also unclear points in this description.

To the east of the Trans-Baikal Territory, nests of the Chinese bush warbler have not yet been found. The information about this species in the Amur region is limited to a few observations of birds in the breeding period. Several singing males were encountered in June–July 1970 in the vicinity of the village of Klimoutsy, in bushes along the shore of a dry spring (Smirenskii and Boehme, 2010). In general, the Chinese bush warbler is rare in the eastern part of the region, but in some places it is common: not less than 5–6 singing males per km² were noted during the breeding season in the vicinity of Dolgoe Lake in the Antonov Forest of the Khinganskii Reserve (Antonov and Parilov, 2009). In 2009, six territorial male Chinese bush warblers were regularly encountered during the summer season in the Muravyevskii Nature Management Park (Stein, 2011).

The goal of our work was to describe the breeding of the Chinese bush warbler in Amur oblast (Amur Territory), to reveal new details of its breeding biology, and to supplement the observations made earlier.

MATERIALS AND METHODS

We observed singing male Chinese bush warblers in the Arkharinskaya Lowland in the vicinity of Kleshinskoe Lake in the Antonov Forest of the Khinganskii Reserve in the first and second ten-day periods of June

2016. The observations were continued at the Zeya-Bureya Plain of the Muravyevskii Nature Management Park from the third ten-day period of June to the second ten-day period of July 2016, inclusively. A nest of the Chinese bush warbler was found there on June 28, 2016 (49°53'02.65" N, 127°41'49.97" E).

The nesting activity was monitored with a Bushnell X86MP photo-trap. According to the maximum possible technical parameters of this model, the survey was performed during each act of motion in the field of view of the photo-trap, at intervals of 15 s with a break of 1 s. The photo-trap was installed on a support at a distance of approximately 80–100 cm from a nest without masking. A memory card was changed once a day. The observations using the photo-trap were interrupted by surveys with a professional Sony HVR-Z5E camcorder. The materials captured by the camcorder made it possible to analyze comprehensively the behavior of birds due to their high quality; the same materials obtained using the photo-trap did not always allow us to identify the sex of adult birds and to see the details of the nesting activity.

The dates and time of observations, as well as the type of video equipment used for the surveys, are presented in Table 2.

On the nights of July 10 to 11 and July 12 to 13, a night survey was made using the photo-trap.

Visual observations of the activity of adult Chinese bush warblers were carried out at the nesting site at a distance of 30 m from the nest higher upwards along the slope, from under the cover of tall grass.

We did not notice any difference in appearance between the male and the female, but from the first moments of observations we got a lingering impression that their behavior near the nest was different, and these differences were stable. The bird that we identified to be the female by the nature of its behavior was noted to have “gaps” in the head plumage, which were probably related to the beginning of molting. The “gap” on the right was always noticeable when the

right side of the bird got in the camcorder's view, and the "gap" on the left, closer to the neck, was less noticeable and was not always visible. The male had no damage to the plumage. Other special features, which are suitable for rapid and permanent recognition, were not revealed. The features of the behavior of the male and female we marked are analogous to the observations made by Sokolov (2013).

The final description and measurements of the nest were made after the chicks had left it. A fragment of the shell, embryo, one of the chicks in the downy attire, and the nest (after the release of the chicks) were collected.

The calculations of time in the analysis of video surveys were made using the online calculator <https://www.calc.ru/perevod-vremeni.html>, and the remaining calculations were made in the Excel 2007 program. To synchronize the views on the periods of activity of birds connected with the beginning of day and night, the data of the site <http://voshod-solnca.ru/> were used. The sunrise for the city of Blagoveshchensk (approximately 50 km from the work site) took place on July 13, 2016, at 05:35:02, and sunset took place at 21:38:21. Accordingly, the day length was 16:03:18. The beginning of twilight was visually noted by us from 21:00 local time, and from 21:30 it began to deepen. The decrease in illumination began even earlier in thick grass, near the ground.

RESULTS

Singing male Chinese bush warblers were encountered by us in the Antonov Forest of the Khinganskii Reserve (near Kleshinskoe Lake) as early as since the first ten-day period of June. In the morning hours, three males were regularly heard to sing in an area of 600–700 m in the Borzya River floodplain in the woodlands of goat willows with extensive motley-grass meadows and clumps of Manchurian hazels. During singing, they often perched on willow bushes and quite often let an observer approach to a distance of up to 20 m. Singing was sometimes heard from the grass, which was not higher than 40–50 cm in the first ten days of June.

It is interesting that P.V. Kvartal'nov, who worked in the same place in 2013–2014, noted few male Chinese bush warblers to sing only twice, on June 12 and July 18 (personal communication).

In Muravyevskii Park, observations started on June 19; Chinese bush warblers were noted to sing near a central estate (in a lowland behind cages with cranes).

Habitats

Two types of habitats, which are typical for Muravyevskii Park as a whole, can be distinguished in the vicinity of the found nest of Chinese bush warblers. These are areas free of water: agrolandscapes (plowed

crop areas and sites overgrown with weeds), which alternate with rises of earth in swamps, which are covered with Mongolian oaks (*Quercus mongolica*), white and black birches (*Betula platyphylla* and *B. davurica*), aspens (*Populus tremula*) or individual frequently sparse groups of trees and shrubs, Manchurian hazards (*Corylus heterophylla mandshurica*), and bicolor lespedezas (*Lespedeza bicolor*). Another type of habitat is waterlogged depressions, i.e., marshes overgrown mainly with sedges (*Carex*), among which there are sparse groups of the above tree and shrub species growing in uplands.

The Nesting Site

The nesting site is an open place overgrown with high grass that is located on a gentle slope descending to the lowland between two elevations, a rise of earth in a swamp, and a field (Fig. 1). Here the vegetation was mainly composed of herbs: reed grass (*Calamagrostis*), bluegrass (*Poa*), wheatgrass (*Elytrigia*), and wormwood (*Artemisia rubripes*), with the presence of the field sow thistle (*Sonchus arvensis*), hop clover (*Trifolium campestre*), and Amur pea (*Vicia amurensis*). At a distance of 1 m from the nest there was a willow bush ($d \approx 4 \times 4$ m and $h \approx 2$ m). There were three more willow bushes of 3–5 m in height and 2–4 m in width at a distance of 15–25 m from the nest. At a distance of 15 m from the nest, lower down the slope, there was a clump of the southern reed (*Phragmites australis*), where, somewhat deeper, there was a waterlogged swamp area. At the time of detecting the nest on June 28, the grass height at the nesting site mostly was 1.1–1.2 m, and on the day of the release of chicks on July 15, the grass height was approximately 1.3 m; there were a few areas with a grass height of up to 1.6 m, where the grass had fallen somewhat. The height of reeds near the edge of the clump was 2–2.5 m. The nesting site and surrounding territories had a thick layer of dry grass of the previous year near the ground. A dirt road passed at a distance of 20 m from the nest. The state of the road, which was somewhat quite densely overgrown with wormwood ($h = 1.0$ – 1.6 m), indicated its rare use. However, it was used one or two times by vehicles during the breeding period of Chinese bush warblers. The road led to the fields located near the nesting site; the fields were partially planted with potatoes and partially remained untreated this year and were covered with weeds.

Nest Location

The nest was located on dry grass near the ground and between wormwood and herb stems (Fig. 2). Above the nest there was a hanging bunch of dry grass, which formed a "bridge" and partly covered and masked the nest. On all sides, dry and green grass stems formed a fairly dense barrier directly around the nest. When viewed from the side, the nest could not be



Fig. 1. View of the nesting site of the Chinese bush warbler (*Tribura tacsanowskia*) (Muravyevskii Park, Amur region).

noticed even from nearby, and from above it looked like a neat elongated hollow structure built into dead dry grass. When the grass around the nest was removed, it turned out to be a slovenly “rugged” building with uneven edges and its profile resembled a horizontally turned drop. The vertical grass stems surrounding the nest were braided with edge grasses of the outer nest layer loosely, without the use of fastening materials, webs, or fuzz.

By the way, the nest of Chinese bush warblers that was found in 1983 in southeastern Transbaikalia by E.P. Sokolov was located on the ground, under high and not very thick grass (written communication).

Nest Structure

The outer layer of the nest has the form of loose edges of the upper part of its structure. On one side, it is well marked, and on the other side, it is almost absent. The outer layer is made mainly of dry and a few green relatively large and broad herb leaves, to a lesser extent, sedge leaves with the inclusion of few small dry wormwood leaves. The middle layer is more neat and compact. It is this layer that forms the nest structure, which protrudes in its lower part from the outer layer. The nesting hollow is made of herb leaves, which are somewhat narrower than those that constitute the outer layer. It also contains a few small wormwood leaves and also some green herb leaves. The nesting hollow is covered with very thin dry blades of grasses, perhaps small sedges, or fragments of split leaves of sedges or herbs. The nest contains absolutely no mate-

rials of animal origin (wool, feathers, down), as well as tree leaves or needles.

The outer diameter of the nest is 9.5×8.0 , the inner diameter is 6.7×5.5 cm. The depth of the nest is 5.8 cm. The height of the nest is 10.5 cm. The height of the upper edge of the nest above the ground is 20 cm on the one side and 19 cm on the other side. The height of the lowest point of the nest above the ground is 9 cm.

Egg Description

At the time of detection, on June 28, there were five eggs in the nest (Fig. 3). The dimensions are given in Table 1. The shape is ovoid, somewhat elongated. The color of eggs is as follows: the background is white, covered with reddish-brownish small dense speckles, which become even denser at the blunt end, forming a whisk. Below we give a description made with the help of a magnifier and binocular microscope and on the basis of enlarged photographs. Several types of coloring elements can be distinguished (in the direction from the deep layers to the surface ones) by size, color, and degree of intensity (which probably depends on the depth of the location):

—A few lilac-gray spots are located more densely at the blunt end. They form a background for other types of spots. They look the most blurry. Their size varies from large to small.

—Multiple reddish brown spots are scattered all over the surface. Their size varies from small to large, but these spots are smaller than large spots of the pre-



Fig. 2. Nest of the Chinese bush warbler (*Tribura tacsanowskia*) after the release of chicks (Muravyevskii Park, Amur region).



Fig. 3. Clutch of the Chinese bush warbler (*Tribura tacsanowskia*) (Muravyevskii Park, Amur region).

vious type. They do not look clear too. They have an uneven, irregular shape, which is sometimes similar to curls, strokes, and blots.

—Multiple reddish brown spots, which are more contrasting than the spots of the previous types. Their shape is closer to round or elongated, with uneven, blurry edges. The spots are scattered over the entire

surface, more densely at the blunt end, forming a whisk. At the blunt end, especially on the whisk, the spots overlap each other, leaving only very small areas of the background visible.

—Relatively rare spots that have a reddish brown color, which is darker than that of all the others. These spots look the clearest. Their shape is more often elon-



Fig. 4. 3-day-old chick of Chinese bush warblers (*Tribura tacsanowskia*) (Muravyevskii Park, Amur region).

gated, looks like straight or curved lines or dots. The size varies from very small to large. A very rare coloring element composed of thin long intermittent lines, which are located on the whisk and are not present on all the eggs, can be referred to the same type of color.

One of the eggs was damaged. The egg was found to contain an embryo of approximately 5 mm in size and a blood clot.

On July 2, the grass on one side of the nest was damaged. Probably, someone had passed by and trampled down the grass, having left a clearly visible trace. The nest was whole, and an adult bird was incubating four eggs. After it left the nest, all four eggs were located vertically.

Chick Description

On July 6 at 09:40 four chicks were found in the nest, and one of them was taken (Fig. 4). During the description, which lasted about 20 minutes, it raised its head 5–6 times and opened its beak in response to manipulation with it. The ears of the chick were open, one eye was closed, and the other one was slightly opened as a chink during the examination. A dry umbilical cord had not yet been detached. The weight of the chick 30–40 minutes after its being taken from the nest was 2.9 g. We believe that the hatching of the chicks took place on July 4. According to the data of Sokolov (2013), the hatching of five chicks lasted two days, the weight of a 2-day-old chick was 2.45 g, and that of a 3-day-old chick was 3.4 g.

The color of the body skin is yellowish cream, and the color of the head is gray with a pinkish shade; the head has a “cap” with blurred edges; the closed eyelids and area between the eyes have a dark gray color. The tip of the upper beak area is yellow, the area of the egg tooth is darkened. Further to the base of the beak, a slightly yellowish tint in the nostrils area smoothly passes into the flesh color. The color of the upper beak area around the nostrils is gray, with a narrow edging. The yellowish flesh-colored skin areas with dark spots that are germs of pin-feathers extend from the eyes to the nostrils on the sides of the upper beak area. The lower beak area is pale yellow. The beak ridges are pale yellow and are noticeably brighter than the yellowish upper beak areas. The throat is yellow, not bright. The base of the tongue is slightly pinkish. The tongue has three points, two pair points are located closer to the base of the tongue, have an oval shape and black color, and the third point is closer to the tip of the tongue, has a dark gray color, and is smaller in size (Fig. 5). The feet and claws are yellowish, not bright. The skin on pterygiae is gray, it has black dashes that are germs of feathers. The downiness is weak. The gray down on the supraorbital pterygiae (the thickest down) is 0.7 mm thick, the down on the occipital pterygiae is 0.5 mm thick, the down on the shoulder pterygiae is 0.5 mm thick, and the down on the dorsal pterygiae is 0.5 mm. The presence of down on the same pterygiae in chicks of Chinese bush warblers were written about by Sokolov (2013) and Ilyashenko (2015).



Fig. 5. Spots on the tongue of the chick of Chinese bush warblers (*Tribura tacsanowskia*) (Muravyevskii Park, Amur region).

Monitoring of the Nest

On July 6, no signs of the presence of birds were detected over the grass in the environs of the nest for 30 min. Probably, they move mainly in thick tall grass.

The activity was monitored on July 8, over 3 hours, from 05:30 to 08:30. The adult birds appeared over the grass seven times. The length of flights above the grass was from 6 to 40 m, on average 21.7 m. In four cases, flights were made from the nest, and in three cases they were directed to the nest. Approaching the nest, the birds always sat in the grass at a distance of 1–2 m from the nest. When leaving the nest, they flew up from the grass at a distance of 3, 4, 10, and 15 m from the nest, on average, 8 m. When approaching the nest with feed, the adult birds were observed two times to sit down on branches of willow bushes located at the nesting site; they stayed for a few seconds, shaking their wings and tail with small intervals. In all cases the flights were made at a low height, directly above the grass.

On July 10, the feathers of the chicks noticeably grew.

On July 11, after heavy rain and wind, the tall grass fell in some places, and the view of the site around the nest greatly changed.

On July 12, (the chicks reached the age of 8 days), from 10:50 to 11:50, the visible activity of the birds over the grass was monitored. Only departures from the nest were recorded; therefore, the birds returned to the nest in thick grass. In one case, a bird flew up almost from the nest; in another case, it flew up from a distance of 5 m from the nest and two times from a distance of 10 m from the nest (an average of 6 m from the

nest) to a distance of 20 m, 25 m and, two times, to a distance of 40 m (an average of 31.3 m).

On July 15, when the nest was checked at 10:08, the chicks were not found in it. The female was running around the nest and even ran into it, but did not sit down, immediately running out. The male was not visible. During a repeated check at 10:40, one of the adult birds again briefly appeared in the field of view at a distance of about 60–70 cm from the nest and disappeared in the grass.

Thus, the chicks left the nest on the 11th day and did not return there. Judging by the video, the adult birds fed the chicks at the nest as usual in the evening of July 14. On July 15, the first movement of the adult birds at the nest was noted at 04:40, and the first feeding at the nest was noted at 04:55. Later the adult birds were constantly observed at the nest with feed and brought away litter pellets. The movements of the birds that had not previously been observed took place at 08:52 in the nest and near it: one of the chicks, which was noted at a distance of 5–10 cm from the nest, was going into the grass; at the same time another chick was approaching the nest and climbing into it, and the third one was going out of the nest simultaneously with the second one; then it turned on the edge and climbed back. Further, active movement was observed in the nest. While the chicks were moving from the nest into the grass and back, one of the adult birds was sitting motionless on the edge of the nest, and the second one was not visible.

After the release of the chicks, on July 15, the adult birds visited the nest four more times, at 11:05; 13:54; 14:27; and 16:39. They looked into the nest twice and appeared near the nest two more times, not coming close to it. In the morning of July 16, at 06:54, one of the adult Chinese bush warblers was actively examining the grass for several seconds in search of food near the nest, also not coming close to it. The chicks did not look ready to fly at the moment of release from the nest. However, on July 14, one of them, being taken into hands for photographing (Fig. 6), was actively breaking out and waving its wings. The flight feathers apparently had a length sufficient for flight, but the tail was still very short.

On July 16, at 11:20, the monitoring of the nesting site for 20 min did not reveal any activity of the adult birds over the grass. At 11:43, during the change of a memory card in the photo-trap, one of the Chinese bush warblers approached the nest to a distance of 50–70 cm in the thick grass and almost immediately disappeared from sight. Then it briefly showed itself three more times at approximately the same distance. Only at 12:48 was an adult bird noted to fly to a distance of 20 m from the nest to the reed thickets.

On July 17, from 07:09 to 10:09, flights of the adult birds over the grass were observed six times. Their movements were confined to the site at a distance of 20–25 m from the nest at the border of tall grass and

reed thickets, which they visited three times. In the same place at 07:36 and 08:19, the male was noted to sing in the grass for 14 and 3 minutes, respectively.

On July 18 at 07:20 we visited the nesting site of the Chinese bush warblers for the last time to finally describe, photograph, and collect the nest. An adult bird appeared only once at 07:58. This time it remained in sight for a few seconds, not in the thick grass, as before, but openly, on the branches of the willow bush.

Behavior of Adult Birds at the Nest

When an observer was near the nest, the Chinese bush warblers behaved remarkably. On June 28, at the time of detection, the female left the nest and was moving within a radius of 10–20 cm. It actively attacked the researcher who was examining the nest, pecking his hands when they were brought close to the nest and sometimes sitting down on the nest. It tried to lead the researcher away: it ran from the nest to a distance of up to 2 m, spreading its wings and fanning its tail, one wing was raised and spread more, but then it almost immediately returned. The male was also running in the grass near the nest, but a little farther, in a radius of about 1 m. Unlike the female, it did not try to attack and peck hands and seemed more cautious because of this. During the second visit to the nest with a clutch on July 2, the behavior of the birds was the same.

On July 10, when the nest was checked (within 5 minutes), the female was running nearby, sat down on it three times, was sitting for a certain time and attacked hands three times. The male was also running around, a little farther, sometimes hiding in the grass, was also trying to lead the researcher aside, but not so actively.

On July 11, during the check, the female was displacing all the time from the nest to moving hands, sometimes sat down on the nest and sometimes attacked. This time the male behaved more actively; it attacked and pecked at the hands like the female, but did it less often than and after the attack ran away further, completely disappearing from sight for some time.

On July 12, the female behaved more calmly, spent more time on the nest, and attacked less often. At the same time, the male “grew bolder,” and attacked more often than the female. When attempts were made to shoot birds on a phone’s video camera, the female quickly approached by herb stems to a distance of approximately 30 cm and, having rushed, pecked the screen.

On July 13 and 14, both birds periodically attacked while the camcorder was being set up. The female also sometimes sat down on the nest. Most likely, it sat down for a moment on the arm of the person sitting near the nest and at the moment when he was standing



Fig. 6. Chick of Chinese bush warblers (*Tribura tacsanowskia*) before the release from the nest (Muravyevskii Park, Amur region).

motionless looking at the bird, it rushed, trying to peck him in the eye.

In the opinion of N.A. Formozov, due to their secretive way of life, Chinese bush warblers are not very vulnerable to large predators, and their main enemies are small animals that live on the ground in tall grass and which they take away from the nest, without fear of attacking them and manifesting aggression.

It should be noted that as the nest was approached we never happened to observe the birds to fly up from the grass when being frightened. The video records show them running away on the grass near the ground just before the arrival of the researcher.

Surveys with the Professional Camcorder

The total survey time was somewhat more than three hours (186 minutes). The amount of time spent by adult birds at the nest is remarkably high, approximately 152 min or 81.7% of the total observation time.

On July 13 and 14, the male ejected six litter pellets of chicks in 3 hours of observation.

As can be seen from Tables 3, 4, and the description, the Chinese bush warbler has a distribution of nesting roles between the male and female. The female spends more time with chicks at the nest, taking care of them. The male also makes a great contribution to the service of chicks and the nest by feeding and ejection of litter pellets. The approximate ratio is 70/30 in the first case and 30/70 in the second case. In addition, during the observation, the male removed fallen grass blades from the nest three times, and the female removed them one time; one more time, while being

Table 3. Parameters related to the stay of male and female Chinese bush warblers at the nest in the daytime according to the data of surveys with the camcorder (Muravyevskii Park, Amur region)

Parameters (for 3 h of observations on July 13–14)	Male	Female
Number of episodes of staying at the nest	12 (35.3%)	22 (64.7%)
Total time (min) spent in the nest	54 (35.5%)	98 (64.5%)
Average duration of one-time staying in the nest, min	4.5	4.5
Spread of values of the duration of one-time staying in the nest, min	0.3–8	1–12

in the nest, the male threw out some fairly large insect from it.

Each portion of feed was given to one chick; only once did the female, bringing a lot of feed, feed two chicks.

Leaving the nest, the female, unlike the male, often returned without feed. It also stayed at a distance of 10–20 cm from the nest while the male was feeding chicks, and returned almost immediately as it left and was sometimes sitting near the nest for a certain time.

The chicks remained without a noticeable presence of the parents eight times, for a time interval of from 40 seconds to 3.5 minutes, on average, for approximately two minutes, for a total of approximately 15 minutes, which was 8.1% of the total observation time.

While at the nest, the adult Chinese bush warblers often did not sit down, but were standing over the chicks. Presumably, this position is due to covering, masking, and protecting the chicks rather than their heating, since it was quite hot in the daytime (25–30°C in the shade).

Thirty-two portions of feed were determined to include nine (50%) dark butterflies, five (27.7%) horseflies, two (11.1%) flies, one (5.6%) spider, and one (5.6%) smooth green caterpillar ($n = 18$). Butterflies were fed to the chicks with wings.

Surveys with the Photo-Trap

The main parameters of the nesting activity of the Chinese bush warbler are presented in Table 5 and in Fig. 7. Below, we describe some aspects of the bird behavior and give data not included in Table 5.

To make a comparison with the indicators revealed by the survey with the camcorder, below we present the proportion of the male and female contribution to feeding and ejection of litter pellets on July 11 at the time interval from 04:15:19 to 19:27:06 when the visibility near the nest was the best (the chicks had reached the age of seven days). Over a time period of 15 hours 11 minutes 47 seconds, the adult birds fed the chicks 70 times, of which 39 times chicks were fed by the male (55.7%), 16 times they were fed by the female (22.9%), and in 15 cases (21%) the sex of the feeding bird could not be determined. Without taking account of the last category, where the sex of the feeding bird was not determined, the proportion of feeding by the

male and female was 70.9% and 29.1%, respectively ($n = 55$). For the above period, the adults ejected 24 litter pellets. Of these, 14 (58.3%) pellets were ejected by the male, one pellet (4.2%) was ejected by the female, in 5 cases (20.8%) the sex of the ejecting bird was not detected, in 2 cases (8.3%) the female ate pellets, in 1 case (4.2%) the sex of the bird that ate pellets was not identified, and in 1 case (4.2%) the female ejected a pellet, having taken it from the male.

The observations made with the photo-trap confirm the above conclusions about the predominant role of the male in feeding chicks (Table 4) and ejecting litter pellets.

Of interest is the behavior of the adult birds concerned with the ejection of litter pellets of chicks. In three cases, pellets were eaten: on July 11 at 06:55 the sex of the bird that ate pellets could not be identified and on the same day at 07:40 and 18:19 the female did it. In the morning it ate a pellet near the nest, and in the evening it ate a pellet having moved away to a distance of 30–40 cm. In two cases, on July 11 and 12, pellets were noted to be taken by the female from the male. In the first case, a pellet was taken from the male after it preliminarily fed a chick. It was carefully moving with it at the edge of the nest and at this moment it was rapidly approached by the female that had been waiting near the nest till feeding was over. The male tried to evade, but the female insistently took off the pellet and carried it away. A similar behavioral episode

Table 4. Number of feedings of Chinese bush warbler chicks (*Tribura tacsanowskia*) by the male and female on July 13 and 14 for 3 h of observations, according to the data of surveys with the camcorder (Muravyevskii Park, Amur region)

Date/period of observations (surveys)	Number of feedings		
	total	male feeding	female feeding
July 13 12:30–13:30	12	8	4
July 14 08:30–09:30	12	8	4
July 14 09:45–10:45	8	7	1
Total (for 3 h)	32	23 (71.9%)	9 (28.1%)

Table 5. Main parameters of the nesting life of Chinese bush warblers (*Tribura taeanowskia*) from July 10 to 15, 2016, according to the data of surveys with the photo-trap (Muravyevskii Park, Amur region)

Date	Time of surveys (beginning/end)	Total duration of surveys (h/min)	Period of breeding activity (h/min)	Number of feedings for the period of breeding activity	Time of the last evening and first morning feeding	One feeding per unit time (min)	Number of ejected pellets for the period of breeding activity	Ratio of the number of feedings per ejected pellet	Time of the beginning and end of the night period (beginning/end)	Duration of the night period (h/min)	Notes
July 10—11	19:05:18/ 19:38:39	24:33/1473	16:56/1016	72	20:11:15/ 04:15:19	14.1	26	2.8	20:37:57/ 04:15:19	07:37/475	
July 11—12	20:07:25/ 12:01:11	15:54/954	08:29/509	54	20:51:35/ 04:19:21	9.4	15	3.6	20:54:11/ 04:19:21	07:25/445	
July 12—13	12:19:51/ 12:02:22	23:43/1423	16:39/999	87	19:35:36/ 04:15:56	11.5	30	2.9	20:55:08/ 04:15:56	07:21/441	
July 13—14	13:54:42/ 07:48:29	17:54/1074	06:45/405	23	19:53:24/ 04:28:56	17.6	6	3.8	20:39:41/ 04:28:56	07:49/469	
July 14—15	11:00:12/ 10:01:51	23:02/1382	15:17/917		19:26:19/ 04:55:23				20:56:04/ 04:40:13	07:44/464	On July 15 at 18:53 the chicks left the nest
					Average	12.4		3.1		07:39/459	

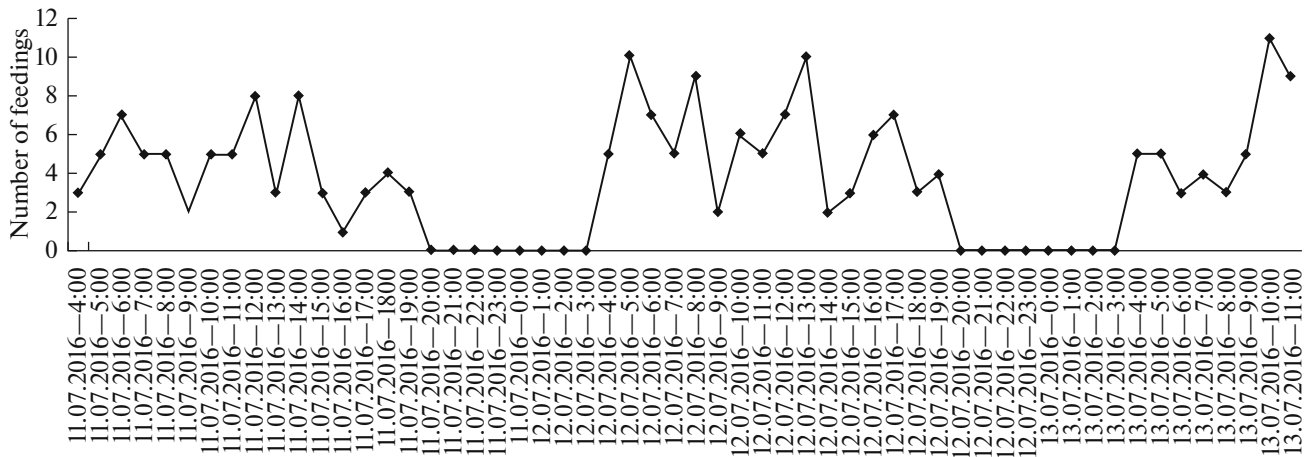


Fig. 7. Distribution of feedings of Chinese bush warbler chicks (*Tribura tacsanowskia*) from 4.00 on July 11 to 11.00 on July 13, 2016, according to the data of surveys with the photo-trap (Muravyevskii Park, Amur region). The data on the number of feedings may be underestimated at 19:00 on July 11 and at 12.00 on July 12, which is due to the nest being visited by the observer.

occurred the next day, but this time the male managed to evade her and carried away the pellet himself. On the following days, neither the eating of pellets nor their take-off was noted.

During the daytime activity of birds (912 min) on July 11, the ratio of feedings and pellets produced by the chicks was 2.91 to 1, which on average agrees with the data for the other days (Table 5). On the same day, for an observation period of 15 hours and 2 minutes (912 minutes), the adult birds fed the chicks on the 7th day of life 70 times, so that one feeding was performed every 13 minutes, which corresponds to 4.6 feedings per hour. According to Sokolov (2013), five 5-day-old chicks were fed by the adults 3–4 times for 1 hour.

During the night observations, the female was continuously at the nest. The night of July 10 to 11 was 7 h 37 min (475 min) and lasted from 20:37:57 to 04:15:19; the female sleep at the nest lasted 6 h 20 min (380 min) from 21:42:28 to 04:02:20; the night of July 12 to 13 lasted 7 hours 21 minutes (441 minutes) from 20:55:08 to 04:15:56, and the female sleep lasted 5 hours 34 minutes (334 minutes) from 21:43:37 to 03:17:26. All the female's staying at the nest during the night can be divided into two types: wakefulness and sleep. During wakefulness the female was sitting at the nest like in the daytime. During sleep she turned her head under her wing, changing the direction of the turn from time to time, periodically waking up for a short time of less than 15 seconds; in those moments she looked around, shook her feathers, briefly cleaned herself, sometimes stood up, and shook her head.

The female's staying at the nest during the night of July 11 to 12 confirms the fact that in the morning of July 12 at 04:19:21 it was the male that brought feed for the first time this day, fed the chicks, and replaced the female. We assume that the female had also been at the nest with the chicks during all the other nights. This

observation and the revealed role of the female, in turn, give reason to believe that the role of the female in hatching eggs is at least predominant.

On all days of observations, except July 15, the activity of the birds in the morning began with feeding the chicks. In the evening, the activity of the birds did not end with the last feeding. Most often the female approached the nest without feed, was sitting for a certain time, then left again for a short while or sometimes simply was near the nest. The period between the last evening feeding and final return to the nest at night was fairly long: from 2.6 to 89.7 min, on average, 50 minutes.

Observations of Certain Aspects of Life of the Chinese Bush Warbler

Apart from singing of the male, it is difficult to talk about the sound signals of this species near the nest without special studies. The sound activity of adult Chinese bush warblers near the nest is minimal. No alarm signals were heard either in the case of an observer approaching and being near the nest with a clutch, or with chicks, or an hour after the chicks left the nest, nor on the subsequent days when the brood was at the nesting site.

The video records made using the professional camcorder showed that a Chinese bush warbler approaching the nest with feed in a number of cases uttered a quiet single slightly hissing "chek" sound. Sometimes such a sound was not heard, but the partner sitting at the nest and (or) the chicks showed signs of recognizing its arrival. The adult bird sitting on the chicks stretched out its head and sometimes rose up, and the chicks thrust out their heads out from under the sitting parent and uttered characteristic, food-asking signals.

These “asking” signals of chicks during feeding are the most noticeable sound accompaniment of nesting life of the Chinese bush warbler. They can be reproduced as a frequent, integral, high sound “tsii-tsii-tsii...” Sometimes, during the periods of frequent feeding, the arrival of an adult bird with feed was responded to by “asking” sounds of only one or two chicks. Sometimes one of the chicks uttered a single short sound that was similar to clicking or a short “chk-chk” and supposedly was not related to feeding. On the day preceding the release of the chicks from the nest, on July 14, when the adult birds were not present nearby, one of the chicks uttered a series of five short sounds similar to a single squeak with pauses of 3–6 seconds. In our opinion, these sounds were not associated with feeding, but rather announced about the presence. This chick was in the active state, somewhat above the others, which were lying motionless. Its eyes were open, and it looked around from time to time.

It is worth noting the movement of the adult Chinese bush warblers, which can be called “running” on vertical grass stems. While making wide steps, they demonstrated an excellent “stretching” both forward and sideward. Maneuvering while moving between stems, they sometimes leaned on the grass with wings like with hands to maintain equilibrium. The same movements were sometimes noted when feeding the chicks: bending into the nest, a bird maintained equilibrium leaning on a spread wing on the edge of the nest or grass.

In many photos on the Internet (and in the descriptions), the speckles on the chest of adult birds are not noticeable in this species. We noted the same watching the video records. The speckles are not visible when a bird is sitting quietly on the nest with fluffed up feathers. They are noticeable during the bird’s moving when it is alarmed, when the neck is stretched forward and upward and the plumage is somewhat pressed against the body.

It should be noted that Black-browed Reed Warblers (*Acrocephalus bistrigiceps*) and Oriental Great Reed Warblers (*A. orientalis*) nested nearby. A nest of the latter was at a distance of 25 m, and adults often appeared at the nesting site and in the willow bush near the nest of the Chinese bush warblers. No signs of aggression or conflict were noted. Of the species inhabiting the neighboring nesting sites, in addition to the above-mentioned species, one pair of Black-faced Buntings (*Ocyris spodocephalus*) and Long-tailed Rosefinches (*Uragus sibiricus*) were constantly observed at each site; the singing of two male Lanceolated Warblers (*Locustella lanceolata*) and of at least two male Pallas’s Grasshopper Warblers (*L. certhiola*) was regularly heard.

Other birds of this species were not found near the nesting site of Chinese bush warblers. Only once was a male noted to sing actively at a distance of 250–300 m, behind a rise of earth in a swamp, at the edge of a fire-

site with motley-grass meadows overgrown with lespezas, hazels, with clumps of willow trees, birches, aspens, poplars, and bird cherries. Subsequently, it did not happen to be heard.

Thus, from June 19 to July 18, 2016, three male Chinese bush warblers and a pair with a nest were marked in the vicinity of the central estate of Muravyevskii Park. The singing of a male near the central estate (behind the cages with cranes) was noted during the whole period of our observations. It could be heard at very early and later morning hours and in the evening, as well as at twilight.

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COMPLIANCE WITH ETHICAL STANDARDS

Conflict of interests. The authors declare that they have no conflict of interest.

Statement on the welfare of animals. All applicable international, national, and/or institutional guidelines for the care and use of animals were followed.

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