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The Blakiston's Fish Owl (*Ketupa blakistoni*) at north-eastern limits of its range

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Kurzfassung: Neue Erkenntnisse zur Verbreitung und Brutbiologie des Fischuhus (*Ketupa blakistoni*) an der nordöstlichen Arealgrenze werden hier dargestellt. Im Buksendya- (153°15'E, 59°12'N), Yama- (152°59'E, 60°00'N) und Nayakhan-Flusstal (158°15'E, 62°33'N) lebten meist Einzelvögel im Spätsommer, Herbst und Frühwinter. Brutpaare siedelten an Chelomdzha und westlich an Inya, Kava und Ulbeya. Neue Beobachtungen an Inya (Juli-August 1999) und Chelomdzha (Juli 2003) bestätigten ein regelmäßiges Vorkommen an Mittel- und Unterläufen. In den Wäldern des Kava-Chelomdza im Magadansky State Reserves kam die Art regelmäßig vor (Tarkhov & Potapov 1986). Das Chelomdzha-Flusstal bildet wahrscheinlich die nordöstliche Arealgrenze. Im Duett singende Partner wurden ab Anfang Februar gehört, meist 20-40 Min. nach Sonnenuntergang. Die Gesangsdauer nahm von 3-5 Min. Anfang Februar auf 30-50 Min. Mitte März zu. Die Pausen zwischen den Strophen schwankten zwischen 14-55 Sek. (Mittel: 27 Sek., n = 48).
Jungvögel schlüpften zwischen dem 2. und 5. Mai. Die Eltern saßen tagsüber in Nestnähe in Lärchenkronen. Während der größten Wachstumsrate der Jungvögel wurden vier- bis fünfmal pro Nacht Fische von 18-30 cm Länge gefüttert. Die Mitternachtsstunden verbrachten die Eltern in Nestnähe. Nach 50 Tagen verließen die Jungen das Nest und wurden weiter von den Eltern betreut.

Abstract: New data on the distribution were the reported: Buksendya river (153°15'E, 59°12'N), Yama valley (152°59'E, 60°00'N) and Nayakhan river (158°15'E, 62°33'N), mostly single birds in late summer, autumn or early winter. Resident breeding pairs regularly occur only in the Chelomdzha and further to the west – in Inya and Ulbeya valleys, and upper heads of the Kava valley (Fig. 1). New observations in the Inya valley (July-August 1999) and in the Chelomdzha valley (July 2003) have proved that the Blakiston's Fish Owl dwells in lush flood-plain woods along the middle and lower streams of both of these valleys. Currently, the Blakiston's Fish Owl steadily occurs within the limits of Kava-Chelomdza forestry of the Magadansky State Reserve (Tarkhov & Potapov 1986), and, most likely, the Chelomdzha valley forms currently the north-eastern limit of the species range. In the Chelomdzha valley the regular duet singing of the Blakiston's Fish Owl begins from early February. Usually the birds display in the evenings, 20-40 min after sunset. The longevity of evening vocalizations increases from 3-5 min in first week of February to 30-50 min in mid-March. The intervals between strophes vary from 14-55 s, 27 s on average (n = 48). The chicks hatched between 2nd and 5th of May. Daytime hours the parents spend nearby the nest in the crowns of larches. During intense chick's growth the parents visit the nest 4-5 times in a night. Search for food and hunting takes from 40-60 min. According to photo documents, the parents feed the chicks with sculpins and graylings (18–30 cm in length). The parents spend midnight hours nearby the nest. Becoming 50 days old the chicks leave the nest and roams around supervised by the parents.

Key words: Blakiston's Fish Owl, *Ketupa blakistoni*, distribution, reproduction, activity

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1 Introduction

The Blakiston's Fish Owl *Ketupa blakistoni* is the northernmost representative of the group of four congeneric species, widely distributed in East Asia. Due to continuously declining numbers caused by the scaled logging operations and loss of its prime habitats in the XX century, the species is listed as globally threatened (Collar et al. 2001). The species is listed in the Russian Red Data Book as "critically endangered". Its distribution is limited to the Ussuriland and eastern Sikhote-Alin ranges, Amur drainage and Okhotskian coast. Insular parts of the range include Northern Sakhalin, Hokkaido and South Kurile islands (Kunashir). Total species number is poorly known. Most likely, it hardly exceeds 700-800 pairs. This is a resident species, occupying long-term hunting territories in wooded floodplains of larger valleys.

2 Distribution of Blakiston's Fish Owl at north-eastern limits of its range

This species has been occasionally recorded at the Buksendya river (153°15'E, 59°12'N), Yama Valley (152°59'E, 60°00'N) and Nayakhan river (158°15'E, 62°33'N). All these records, however, refer to single birds encountert in late summer, autumn or early winter. Resident breeding pairs regularly occur only in the Chelomdzha and further to the west – in Inya and Ulbeya valleys. Local hunters also named the upper heads of the Kava valley, but this area still remains inaccessible to biologists (Fig. 1).

My observations in the Inya valley (July-August 1999) and in the Chelomdzha valley (July 2003) have proved that the Blakiston's Fish Owl dwells in lush flood-plain woods along the middle and lower streams of both of these valleys. In the rocky gorges of the upper Inya drainage (145°48'E, 61°27'N) only the Eagle Owl (*Bubo bubo*) occurs, the ranges of the two species being separated by about 50 km gap. In the Tauisk bay basin, to which both Kava and Chelomdzha drainages belong (after confluence the two upper rivers form the Taui river 72 km long), the Eagle Owl is a rare bird recorded so far at the Dekdekan valley (a tributary to Chelomdzha, 147°11'E, 60°15'N) and the Chalboga river (150°32'E, 60°03'N) 101 and 56 km from the sea coast correspondingly. Further North, this species is an uncommon resident of all greater valleys of the Kolyma basin. Thus, on the Okhotskian slope of the Kolyma highlands the Eagle Owl is an exceptionally rare species, and the statement of Vasskovsky (1956), that in 1940-1950's the Blakiston's Fish Owl was more common in the vicinities of Magadan than the Eagle Owl still remains valid. However, both species shrunk their ranges and declined dramatically since then.

Currently, the Blakiston's Fish Owl steadily occurs within the limits of Kava-Chelomdza forestry of the Magadansky State Reserve (Tarkhov & Potapov 1986), and, most likely, the Chelomdzha valley forms currently the north-eastern limit of the species range (Fig.1).



Fig. 1: Distribution of the Blakiston's Fish Owl in NE Russia: I – Inya area; II – Chelomdzha area.

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I found this species to be a regular dweller along an approximately 200 km stretch of the Inya valley from Kheidzhan (145°42′E, 61°09′N) to the mouth (144°54′E, 59°24′N). Local reindeer herdsmen, who call this bird "oomyl" (some local toponims distinctly derived from this word), explain that in winter this bird usually occurs nearby shallow, non-freezing channels (called locally "gadyk") , being mostly common between the Nyalop (145°28′E, 60°40′N) and Nerychenia (144°55′E, 60°05′N) rivers. At this part the valley inclination reaches 3 m/km, average speed of the river 7-9 km/hr (summer lower water level). In this valley, the uppermost spawning grounds of the chum-salmon, *Oncorhynchus keta* occur nearby the Kheidzhan mouth. This is also the northwesternmost record point of the Blakiston's Fish Owl (I-1 on Fig. 1). Inya valley was surveyed by ruft-boats in July-August 1999 and 2000. Most of the records were based on the evening vocalisations of birds. Under such circumstances estimations of local population size based on random encounters with birds wouldn't be much reliable. But if the better known density of the species in Chelomdzha valley is being taken as a baseline (1pair per 8-10 km valley stretch, see below), then the Inya population size falls between 20 and 25 pairs.

The overall length of Chelomdzha valley from the watershed with Inya to the confluence with Kava is 188 km. The area occupied by "braided" flood-plains starts from the Burgagylkan mouth (131 km from Chelomdzha mouth), and the plots grown with tall poplars and larches begin to appear from 115 km from the mouth. Here, the inclination of the valley bottom reaches 2 m/km, the river runs 4-5 км/hr. The uppermost salmon spawning grounds (the chum) occur from 80 km from the mouth (150 km from the sea), but the river is lush of the grayling, *Thimallus* spec. The Blakiston's Fish Owl was found from 110 km upstream (Ch-1, Fig.1) to the mouth. Up to the late 1980s a pair of the Blakiston's Fish Owl nested in the Taui river valley close to Chelomdzha mouth, but later disappeared due to continuous disturbance. In March 2002-2007 I conducted repeated counts of the Blakiston's Fish Owl in the Chelomdzha valley with snow-mobiles. In these years, 10 territories have been identified all together (Fig. 1). On the territories Ch-2 (Khuren), Ch-4 (Kheta), Ch-6 (Moldot), Ch-7 (Burgali), Ch-9 (Omylen) and Ch-10 (Taui,70th km) the species was recorded frequently and steadily from 1982 through 2004. On the territory Ch-8 (Nevta) a pair occurred in 2002-2003, but later disappeared. In 2005-2006 due to heavy rain falls and flooding in two successive summers, the overall topography of Chelomdzha flood-plains has changed dramatically. Large stretches of mature flood-plains with non-freezing channels disappeared. In March 2007, I failed to point the birds at a number of their traditional sites. Judging from the data collected beforehand, each pair of Blakiston's Fish Owls occupies a stretch of valley 7,5 - 8 km in length. The minimal distance between the centers of vocal activity of two neighbouring pairs (Ch-7 and Ch-8), as measured in March 2003 was 6,1 km. Most likely, there were additional pairs occupying the gaps between the territories Ch-1, Ch-2, Ch-5 and Ch-6 , but these sites remain unvisited. Based on these observations, the potential size of the Blakistons's Fish Owl population in Chelomdzha valley could be estimated at 10-12 pairs.

In 1986-1989 we ran a year-round ornithological station in the Yana valley mid-streams, 50 km North-East of Chelomdzha (148°52′E, 60°08′N). At that time, V. Pravosudov did not find the Blakiston's Fish Owl in the area, but in 1999 local "haymakers" shot two subadults there (G. Atrashkevich, pers. comm.). This finding fixes the eastern limit of the species' breeding range at the end of XX century. (Y-1, Fig. 1).

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3 Non-breeding habitats

Pairs of the Blakiston's Fish Owl occur at their hunting ranges during the whole year. Also, the voice of single birds and pair duets could be heard the whole year round, but most frequently in August-October and February-March. In winter the birds inhabit the tracts of flood-plain forest nearby medium-size channels or even big channels nearby non-freezing rapids. In well documented cases a pair's home range includes "wintering hole" of the grayling , charr stretches, and salmon spawning grounds. In winter the typical "K"-shaped footprints of the Blakiston's Eagle Owl's often occur alongside open-water rapids or non-freezing shallows. Much time the birds spend sitting on sticks, protracted out of snowy banks or heaps of driftwood. In late winter, the birds often perch on such poles warming up under sunrays. Such perching sites usually occur nearby non-freezing "gadyks"(Russian term). In search of food the owl roams along the edge of open shoals (10-15 cm in depth), stepping from time to time down into water (Fig. 2). Most likely, their prey in such places consists of sculpins *Cottus*. spec., juvenile lampreys *Lampetra* spec. and juvenile Pacific salmon *Onchorhynchus spp*. In May-June the Blakiston's Fish Owl occurs at forest margins nearby bow lakes and bogs spread over riverside terraces, where flocks of teal *Anas crecca* and other waterfowl stop during migrations. In winter, these boggy habitats interspersed with wooded ridges are inhabited by the willow grouse *Lagopus lagopus*, hare *Lepus timidus*, red squirrel *Sciurus vulgaris*, red vole *Clethrionomys rutilus*, and pika *Ochotona alpina*.



Fig. 2: Winter feeding habitat in the Chrelomdzha valley. The snow tracks left in the nighttime by hunting bird.

Thus, an individual hunting territory of a pair of the Blakiston's Fish Owl occupies the area 8-10 km in length and 500-1000 m in width. The territory includes a stretch of valley with nearby deciduous woods of poplar *Populus suaveolens*, willows *Salix spp.,* and Korean willow *Chosenia arbutifolia*, lateral channels and islands grown with mature and disintegrating larch forests and tracks of boggy terraces.

4 Breeding cycle

Vocal activity:

In the Chelomdzha valley the regular duet singing of the Blakiston's Fish Owl begins from early February. Usually the birds display in the evenings, 20-40 min after sunset. The longevity of evening vocalizations increases from 3-5 min in first week of February to 30-50 min in mid-March (Fig. 3). The intervals between strophes vary from 14-55 s, 27 s on average (n = 48). In some days, even during the peak of the display season (mid-March), the birds may keep quiet. On clean, windless and frosty nightfalls their singing can be heard by man as faras 3-3,5 km. Listening from the borderline of the two territories I often could hear the two heighbour pairs. From time to time the pairs may come close to the borderline, and then an observer may get an impression of high species' abundance. At early stages of incubation (late March), when night temperatures may drop down to -30°C or below, the owls keep silence, but in

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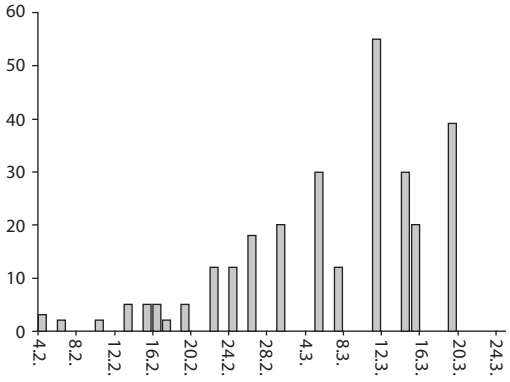


Fig. 3: Duration of evening vocal displays (vertical axis, min) of a pair of Blakiston's Fish Owl in February-March 2003. The asterisk indicates most probable date of copu

April and May they display regularly again at downs and daybreaks and also during 40-60 min around midnight .

Nesting period:
The nest with one chick I found in the Chelomdzha valley on 7 May 2003 (Ch-7, Fig. 1). It was built on the top of broken poplar trunk 45 cm in diameter (90 cm at the breast height), 12 m above ground (Fig. 4). Having several healthy branches, this poplar tree was still alive. It grew among a clump of birches *Betula platyphylla* and larches *Larix kajanderii* 12-25 m in height in the interior part of mature flood-plain forest. The nest was laid with dry fragments of poplar bark, gathered from the same tree. Nearby this poplar I found several pieces of egg shell on the snow (the egg was 54 mm in diameter) and a grayling 20 cm in length. The tract of surrounding forest was interspersed with narrow openings and ditches grown by spiraea *Spiraea salicifolia*. The distance to the nearest river channel was 200 m, to the river bed - 350 m, to the river-side terrace - about 150 m. The parents flew in and out the nest alongside the forest. I never saw them flying the island crosswise. The chick hatched between 2nd and 5th of May. Daytime hours the parents spend nearby the nest in the crowns of larches. First portion of food they bring soon after sunset. During intense chick's growth the parents visit the nest 4-5 times in a night. Search for food and hunting takes from 40-60 min. According to photo documents, the parents feed the chick with sculpins and graylings

Tab 1: Activity of adults during the nesting period

Dates	Age of the chick	Observation
10./11.3. 2003	5-7 days	22 h parents arrived with food 10 min after sunset, brought food repeatedly at 1h10', 2h55', 4h10' and 5h55'
14./15.5. 2003	9-11 days	1h30' first arrival with food, both parents stayed nearby chick until 4h30', duet singing – now and then
2./3.6. 2003	28-30 days	21h00' duet singing; 23h00' male arrived at the nest (without food), feeding arrivals at 1h00', 1h15', 2h15', 4h20'
4./5.6. 2003	29-31 days	23-50 first arrival with food; feeding arrivals at 0h10', 0h30', 1h50', 2h30', 3h00'; from 2h00' to 2h20' duet singing near the nest
23./24.6. 2003	48-50 days	1h40' feeding arrival
25.6. 2003	49-51 days	The chick fledged

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Fig. 4: Nesting site in Chelomdzha valley. The young bird is 49-51 days old.

(18 – 30 cm in length) (Fig. 5). After several runs the parents spend midnight hours nearby the nest. On some nights, they display their antiphonal duets. Becoming 50 days old the chick leaves the nest and roams around supervised by the parents (Tab 1).

5 Dynamics of the range bounds and limiting factors

Rapid decline of the Blakiston's Fish Owl in the southern parts of the species' range (Sikhote-Alin', Ussuriland) occurring from the late 1960's , was definitely caused by direct or indirect human impact - mortality in fur-traps, fishing nets, declining of fish resources in mountain rivers (Surmach 1998). The same is true for the north, but the balance of negative factors varies among drainages. Dead birds, brought by fishermen or hunters, are often the only source of data on their distribution. All examples of autumnal dispersion of the owls were reported fur hunters.

It turned out, that the north-easternmost periphery of the species' range occurred to be easiest to access and better known, than many other sites inhabited by this bird. For example, ornithologists have never, or only occasionally, visited the vast tracts of land between the Inya valley and Amgun' river. Meanwhile, the valleys crossing the foothills of Dzhugdzhur range in NE part of Khabarovsk province may currently provide a home for essential number of Blakiston's Fish Owls.

Data presented by Vasskovsky (1956) indicate that in early 1950's the Blakiston's Fish Owl was breeding in the lower streams of the rivers draining the Taui Bay basin between Taui river and Magadan - the Yana, Arman' , Khasyn and Ola rivers. However, neither the size of these valleys nor the scale and quality of flood-plain habitats, and the richness of salmon spawning grounds could be compared with the valleys of Chelomdzha or Inya. Only the lower reaches of the Yama river, 180 km east of Magadan, could provide comparable conditions. However, no evidences exist to confirm Ketupa's steady presence there nowadays.

It turns out, that for these smaller valleys between Yama and Chelomdzha the latter might have served a source hotspot, which supported the species' expansion further

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Fig. 5: Adult bird feeding the chick

north-east. This is true even now, but under present-day winter disturbance (snowmobiles, fur-trapping, winter fishing) such a big owl could hardly settle even for a short period. Same string of negative factors acted in the Chelomdzha valley until 1983. Later, the regulations of the strict reserve regime have depressed their impact.

In the Inya valley, designated to be the "land of subsistence husbandry" for the eveny herdsmen, the Blakiston's Fish Owl population depends on natural conditions and its status looks safe. Worth of mentioning, among the evens this bird is respected as a refined delicacy, not a deity of Amurland folks, and a certain proportion of individuals become hunting bag in winter. With these reservations one could conclude that during the 50 years passed after the most recent "estimates" of Vasskovsky (1956), the north-eastern limit of the species range receded almost 150 km westward.

Similarly to the southern parts of the species' range, the worst impact to the Blakiston's Fish Owl in the north is caused by general deprivation of salmon-based ecosystems of the Taui drainage. For an ecologist dealing with the diversity and sustainability of northern habitats it is quite clear, that under scaled salmon industry in the lower streams of the Taui river, and unlimited harvest of grayling and charr in winter, little chances are left for the Blakiston's Fish Owl survival.

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