

DISTRIBUTION, NUMBER AND ECOLOGY OF THE *CINCLUS CINCLUS* (LINNAEUS 1758) IN THE EUROPEAN NORTH OF RUSSIA

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Abstract: The work is devoted to a usual nesting and wintering of the European North of Russia water bird species, the dipper *Cinclus cinclus cinclus* L. 1758. The anthropogenic load on water ecosystems in the region largely increases negatively affecting the population density of this bird. The paper reviews the population status of the dipper since the XX century using the author's data (1965-2013) and literature materials. The number of species remains high in natural habitats. Log drifting was not organized at the nesting places of the dipper and so its number and nesting area remained high and correspondingly spacious.

Keywords: biology, dipper, distribution, ecology, the European North of Russia

Introduction:

The bird can be met in Northern Europe from Finland, Sweden and the Kola Peninsular to 69 °N, in the European North of Russia to the Solovetskie Islands and the Onega River. It also inhabits the Leningrad region, Karelia, all rivers at the mentioned regions up to the cities of Arkhangelsk, Mezen' and Pinega. Eastwards the bird builds nests on the upper river courses of the Timan Range, northwards – up to the Tsilma and Tobysh Rivers, the Izhma River and its left-bank tributaries, the Pechora River and its right-bank tributaries, along the Ural Mountains northwards to the

Western Saledy Ridge. In the Volga-Kama region its distribution area stretches to middle parts of the Southern Urals. Southwards it occurs to the western coast of the Black Sea, northern pre-mountain areas of Caucasia (Dmokhovskiy 1933; Portenko 1937; Sudilovskaya 1954; Teplova 1957; Estafyev 1969, 1974, 1977, 2005; Egorov 1978; Malchevskiy and Pukinskiy 1983; Zimin et al. 1993).

Dipper birds migrate large distances in winter and so they appear in the river valleys of the Northern Dvina, the Luza, the Mezen', the Pechora, the Izhma, the Vychegda, the Vym', in upper Sysola courses. An example has been collected in the Koigorodok region of the Komi Republic at an ice-hole of the Kuim River at 60 °N (now it is a collection example of the Institute of Biology KSC UrD RAS).

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Materials and methods:

The data on distribution, biology and ecology of the dipper have been collected by the author for the period of 1965-2013 in the Komi Republic, the Arkhangelsk region, Finland, and Sweden. Also the appropriate published literature data were used. We conducted field routes (about 65 thousand kilometers) to count population number and number of nesting pairs. Dipper's diet was studied according to its stomach's content and winter findings on icy at feeding grounds as young fish, larvae of dipterans, beetles etc.

Results and discussion:

Sizes. Taxonomy

The dipper *Cinclus cinclus* (Linnaeus 1758) belongs to the Cinclidae family and Cinclidae genus, Borkhausen 1797. The dipper is a species nesting and wintering in the European North of Russia. The study region is inhabited by its typical subspecies *C.c. cinclus* L. 1758.

About 200 bird samples from collections of the Zoological Museum RAS, the Zoological Museum of Moscow University, the Institute of Biology of the Komi Science

Centre UrD RAS, the Pechora-Ilych Reserve, and the Helsinki University have been analyzed (Tab. 1).

The subspecies *C.c. uralensis* Serebrovskii 1927, was described by a male example with a highly light-colored head. Its habitat was reported to occupy the southern part of the Ural Mountains. The bird with a light-colored head was the only exemplar of all birds collected in the Urals at the nesting time and had a very old feathering. According to Serebrovskii (1927), *C.c. uralensis* birds in contrast to other subspecies have a better expressed light- and brown (cinnamonic)-colored upper body part with their down part being more chocolate-brown than it is usually observed for *C.c. cinclus*. The subspecies *C.c. caucasicus* Madarász 1903, are highly variable, whereby *C.c. uralensis* representatives are highly stable by color. Sudilovskaya (1954) did not isolate the subspecies *C.c. uralensis* and *C.c. caucasicus*; she unified them under the subspecies *C.c. cinclus* L. 1758. Portenko (1937) who studied 26 samples from Scandinavia, Finland, and the Kola Peninsula, 35 - from the Northern and Southern Urals, and 82 - from Caucasus, confirmed the existence of *C.c. uralensis*. He characterized young *C.c. uralensis* birds at nests as having more intense slate-colored feathers with black edges.

Table no. 1 Sizes of *Cinclus cinclus* L. 1758 subspecies in the European part of its distribution area

Subspecies	Sizes (mm)			
	wing	tail	hypotarsus	beak
Females				
<i>C.c. cinclus</i>	86.3±1.33	52.2±1.46	26.6±0.26	15.0±0.60
<i>C.c. uralensis</i>	88.1±0.91	53.0±1.37	27.9±0.39	15.6±0.28
<i>C.c. caucasicus</i>	83.3±1.12	49.5±0.79	27.6±0.19	14.9±0.18
Males				
<i>C.c. cinclus</i>	90.1±1.12	54.8±85	27.7±0.18	15.5±0.30
<i>C.c. uralensis</i>	89.3±1.47	54.4±1.00	27.6±0.83	15.5±1.82
<i>C.c. caucasicus</i>	88.7±0.87	50.9±0.84	28.1±0.28	15.5±0.25

Having studied 16 bird samples from the western slope of the sub-Polar Urals (the

Bolsjaya Synya River) and the Timan Range (the Kedva River, i.e. the Izhma River

tributary) the author did not find any reliable differences by color or size of dippers between *C.c. cinclus* and *C.c. uralensis*. Dipper birds nest in the Urals, the sub-Urals, the Timan Range, in basins of the Mezen and the Northern Dvina rivers and westwards in Finland and Sweden. Consequently, distribution area of dippers does not stop by Scandinavia and the Kola Peninsula but stretches eastwards to the Ural Mountains. Southwards, *C.c. uralensis* dippers gradually become light-colored in head and belly, and reduce in size. These signs are better pronounced for *C.c. caucasicus*. Comparing body parts of subspecies by size (Tab. 1), we did not find any reliable differences between *C.c. cinclus* and *C.c. uralensis*. But they both do differ from *C.c. caucasicus*: males - by tail's length, *C.c. uralensis* and *C.c. caucasicus* females - by wing's and tail's length. In all cases, *C.c. caucasicus* birds were smaller (Estafyev 1974).

Among 21 nestlings obtained at different times of the nesting period, the author did not find any reliable difference between the subspecies. Only *C.c. cinclus* and *C.c. caucasicus* nestlings have a darker edge of back feathers. The author relates this divergence to the different age of the collection material. The ecology of birds from the Timan Range, the Ural Mountains, and Karelia also does not differ much except for the beginning of the nesting time.

The collection material confirms the subspecies *C.c. cinclus* and *C.c. caucasicus* met in the Southern Urals and produced hybrids. The collected *C.c. uralensis* birds have some examples with transitional signs which can be easily attributed to any of the study subspecies (Estafyev 1974).

According to Portenko (1937), there is no color difference between these two subspecies, but some individuals of *C.c. caucasicus* have been reported in a darker color on the upper part of head and the forebelly as against *C.c. uralensis*.

But these collection samples were normally old with worn feathers. Consequently, the whole area of the European North and the Ural Mountains is

inhabited by *Cinclus cinclus cinclus* L. (Estafyev 1974) which agrees with the data of Sudilovskaya (1954).

Molting

Adult birds molt in the middle of July (females) and in the third decade of July (males) when they change small feathers. From early August till middle September they change contour feathers, quill feathers, and tail feathers. In the Pechora-Ilych Reserve, they found semi-fledged young birds in nests on June 19 and fledged ones on June 26 but with short quill and tail feathers (Teplova 1957). Northwards in the upper Shchugor stream, nestlings were semi-fledged on July 11 and they left nests on July 27 with underdeveloped feathers (Portenko 1937). Furthermore in the upper course of the Bolshaya Synya River, they found 4 semi-fledged nestlings. A young male from the upper course of the Bolshaya Synya River did not stop moulting towards October 6. Its head, neck, back, uropygium feathers and feathers on the lower part of belly were partly tubed (three quarters of the adult feather's length). The other feathers were new (Estafyev 1977). Young birds change their nestling dress for the first autumn dress from middle July till early October (small feathers, covering wing feathers; the other feathers are replaced in the next year).

Habitat

The species prefers taiga streams with clear water and does not inhabit mountain tundra regions. In the Ural Mountains and the Timan Range it occurs in rivers with rocky bottom and with a stream velocity of 0.7-1.0 m/s. It was not met above the forest belt. In the Northern Urals it reaches areas with heights of up to 800 m above sea level. Dipper birds make nests in niches of riverside sheer cliffs and in roots of fallen trees along river banks. The height of sheer cliffs with cracks and small niches covered by mosses and lichens sometimes reaches 10 m above river surface. These niches

normally fed on ground waters. In pre-mountain and plain areas, the species inhabit sand-pebble tongues with outside fallen trees, stumps, and roots. River bottom on plain is normally sand with some rocks.

Number

In rivers of the Northern and sub-Polar Urals it is a usual nesting species. In rivers of the Timan Range it is seldom. Within 14 km along the upper course of the Bolshaya Synya River (sub-Polar Ural, about 65 °N) we found seven pairs in 1968, four pairs of birds each year for the period 1970-1992. Every 10 km approximately counted 3.6 pairs. The middle part of the Timan Range (a 45 km piece along the Chernaya Kedva River) was identified for three nesting pairs. In the Belaya Kedva River and in the upper course of the Mezen' River, this species is seldom (Estafyev 1981).

In autumn and winter, dippers concentrate at rifts of non-frozen mountain streams and rivers. A 15-km-long piece in the upper course of the Bolshaya Synya River was identified for 14 dippers (October 13, 1968). They fed at light and twilight time, spent nights in roots of trees fallen near river. The northern slopes of the Sablya Ridge saw a decrease in the number of wintering dippers (when comparing between 1968-1970 and 1992). A 14-km piece of the Voi-Vozh River mountain floodplain (the sub-Polar Urals) was identified for only eight birds. This resulted from a strong river over freezing (Estafyev 1977). In the Pechora-Ilych Reserve it goes down to pre-mountain areas forming flocks of 20-30 individuals at non-frozen grounds in winter. At moderately cold winters it can be met on plain rivers (Neifeld and Teplov 2000).

Reproduction

The mating season starts with the end of April. In upper courses of the Pechora River and in the Timan tributaries of the Izhma River (the sub-Polar Urals) it starts at the end of May. From this very time birds form pairs

and gradually, as rivers get free of ice, they occupy a nesting area (usually the same as in the former year). The nesting area is 2-3 km long in the Urals and 5-6 km long in the Timan Range. The pairs build their nests for 1-2 weeks at a height of 1.5-2.5 m above water surface; they usually do not use the old one. The interior nest part is composed with dry moss and grass. The exterior part is composed of green moss and dry plant stems together with plant roots; it is moist as it touches soil or rock. The laying counts 4-5, sometimes 6 eggs. The brooding starts at the end of May and in the western slope of the sub-Polar Urals – at the end of June. In the Pechora-Ilych Reserve, there were 4 semi-fledged nestlings (49 g each) in a nest on June 19. The other nest included 5 nestlings with underdeveloped quill and tail feathers being ready to fly out of nest on June 26. In the upper course of the Shchugor River, there were half-dressed nestlings on July, 11. Three of them flow away on July, 27 (Portenko 1937). The nest at the upper course of the Bolshaya Synya River included 4 semi-fledged nestlings on July 6, 1972. In 1968, young birds flow away from nest on July, 25. In 1970, a 14-km-piece in the upper stream of the Bolshaya Synya River we saw 4 nesting pairs of dippers. On July 16-20, each nest was left by 2-3 nestlings. Once left of nest, nestlings are still fed by adult birds. The number of nesting pairs at this river piece remained stable for 1968-1972. The number of birds in broods was 4 in 1968, 2 for 1969, 2-3 for 1970, 4-5 in-between 1972-1992 (Estafyev 1977).

In the sub-Polar Urals along mountain streams, it seldom builds nests and occurs at a height of 800 m above sea level. On July 13, 1968 we met a dipper bird feeding in the upper course of the Bolshaya Synya River. On July 25 we observed how adult birds feed their nestlings. They carried food from the stream every 3-4 minutes. In 1970, there were four nesting pairs within a 14 km long piece along the Bolshaya Synya upper courses. On July, 16 we recognized a family of 2 well flying nestlings. The female bird sometimes fed up both of them. Broods

normally counted 2-3 nestlings. From mid July adult birds would leave nesting areas. In the upper Shchugor River, we found a nest on July, 11. It was built in tree roots and presented a rough sphere-shaped foundation. Three nestlings left on July, 27. In early July 1972, a nest built in a niche of an abrupt river bank at a height of 1.5 m hosted four semi-fledged nestlings (Estafyev 1977). Dmokhovskiy (1933) observed a brood of four young birds and one adult on August 19.

According to Teplova (1957), dippers build nests in pre-mountain and mountain parts of the Pechora-Ilych Reserve and are abundant in the upper tributaries of the Pechora River. In summer they live on cliffs. Nests were found on cliffs of the Bolshoi Shizhem, Shaitanovka, Pechora Rivers (Verkhnie Klyuchi region). Normally they cannot be surveyed without special equipment as they are attached to an abrupt cliff above the river. In 1944 they surveyed two nests. The first was at the Verkhnie Klyuchi region; it was organized in a niche of a cliff at a height of 1.5 m above the river, made of moss and looked like a round mossy tussock. The nest included four semi-fledged nestlings on June 19. One nestling was taken away for investigation. It weighed 49 g; its stomach had only water or ground insects (larvae and imago of caddisflies, sawflies). The other nest in the upper course of the Bolshoi Shizhem River was surveyed on June 26. It was also made of moss and attached to a cliff 2.5 m above the river. The nest held 5 big non-flying nestlings. They were smoky-grey-colored, their body fully covered by feathers, but the quill and tail feathers were very short; they jumped off and down. In the upper course of the Bolshoi Shizhem River they met an adult female and two nestlings trying to fly on May 30, 1947. In winter, dippers concentrate on unfrozen river parts, plain areas. In October they can already be observed on the rifts of the Pechora River and its Ural tributaries such as the Unya, the Ilych, the Shchugor, Podcherem, Bolshaya Synya etc.

Nutrition

Birds get into water for feed 15-20 times during one hour (usually without diving) in November. They stay under the water surface 3-5 seconds with an interval of 3-4 minutes. Consequently, they stayed about a minute under the water surface during one hour. Dippers began feeding at 9-10 a.m. and finished at twilight time. Birds stay overnight on willow branches at river banks (Estafyev 1977). When not with the nestlings, birds look for food under river surface (larvae of caddis-flies, water coleopterans, other insects and mollusks).

Vladimirskaya (in Teplova 1957) called the dipper an enemy of the young Atlantic salmon fish (*Salmo salar* L.) in the upper course of the Pechora River. For the winter of 1952-1953 the depletion of the number of small fish captured and even their disappearance until spring have been associated with the presence of the dipper in this area.

The dipper obviously feeds on small fish in autumn-summer, though seldom, albeit it does not induce any negative effect on the fishery industry in the Pechora River basin. Once they have nestlings, the birds usually feed when they fly or take it from the ground surface near streams. A dipper sample collected in February had fragments of water insects in its stomach and in August - only ground insects as dipterans, ants, and small beetles. An adult male weighs 71 g and young male 65 g. A bird stomach contains gastric concretions, as follows: October 11 - 1.1 g, October 31 - 0.8 g, November 1 - 0.3 g, November 4 - 0.7 g. The stomach without gastric concretions weighed 0.1-0.5 g at day time.

Conclusion

The nesting area of *Cinclus cinclus* (L. 1758) in the European North of Russia is still safe of any anthropogenic load which provides conditions for successful reproduction and high population size. The stoppage of loose

wood floating also has positive post-effects for nesting and feeding of dipper birds.

Rezumat:

DISTRIBUȚIA, NUMĂRUL ȘI ECOLOGIA SPECIEI *CINCLUS CINCLUS* (LINNAEUS 1758) ÎN NORDUL EUROPEAN AL RUSIEI

Studiul prezintă etapele de cuibărire și iernare ale unei specii de apă specifică Nordului european al Rusiei, mierla de apă *Cinclus cinclus cinclus* L. 1758. Încărcătura antropică pe ecosistemele de apă din regiune foarte mare afectează în mod negativ densitatea populației mierlei de apă. Articolul analizează statutul mierlei de apă din secolul al XX-lea folosind date aparținând autorului (1965-2013), dar și din literatura de specialitate. Numărul speciilor rămâne mare în habitatele naturale. În zonele de cuibărire ale mierlei de apă nu se desfășoară transportul pe apă al buștenilor, astfel că numărul de exemplare a rămas la un nivel înalt, iar arealul de cuibărire este destul de întins.

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