NUMBER AND DISTRIBUTION OF THE MONGOLIAN GULL *LARUS (VEGAE) MONGOLICUS* IN SOUTH BAIKAL

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Abstract. The Mongolian gull is one of the few most widespread species of birds of the Southern Bai-kal - 16.0 ind./km2 or 48.2% of the total number of coastal birds. Its high number remains even under conditions of an acute shortage of forage resources, which is currently observed. Maintaining a high abundance in a limited number of shallow waters - about 7.0% of the total area of the lake Baikal is provided by a very ecological niche wide of this species and some of its morphological features. It is characterized by a relatively large size and a strong, even powerful, and sharp beak, which allows cutting of corpses. She is a polyphage with a very wide range of feeds used - from plant to animal sources and cannibalism. In addition, it is a eurytopic species that uses almost any station for nesting, from swamps and sandy spits and shoals to inaccessible rocky cliffs. The lack of fish resources, which is currently in connection with their strong overfishing observed, is by the transition to forage of anthropogenic origin compensated. There is a very strong decrease in the overall reproductive success of the species. Lack of food forces birds to use cannibalism, up to "sophisticated" predation, when birds kill and eat weaker individuals of their species. That is why this species in the modern period retains a high number, and the complex age structure, due to the long life expectancy, allows it to maintain a sufficiently high abundance in adverse environmental conditions.

Key words: Southern Baikal, Mongolian gull, population density, lack of basic food, reproductive success, cannibalism.

Introduction

The Mongolian Gull *Larus (vegae) mongolicus* is one of the most common and widespread species of gull birds of Lake Baikal [6, 11, 17, 24]. Previously, this species belonged to the Herring Gull *Larus argentatus mongolicus* Suchkin, 1925 [15]. Later, in connection with the refinements of taxonomists, he received a different species status – Yellow-legged Gull L. *Larus cachinnans mongolicus* Pall.,1811 [25-26]. Then, due to genetic proximity, it was to the Eastern Siberian Gulls *L. vegae mongolicus* Sushkin, 1925 assigned [28]. At present, this species is considered the Mongolian Gull *L. (vegae) mongolicus*, although it is possible that it is a subspecies of the East Siberian Gull [16, 22, 28].

The distribution of the Mongolian Gull over the water area of Lake Baikal is extremely uneven. In the estuaries and deltas of rivers, as well as on the islands of the Maloe More Strait and the Chivyrkuisky Bay, it is the most abundant bird, and its main nesting colonies here are located also. In other areas, this species is in small colonies found, as well as during periods of foraging, the formation of concentrations of resting birds and migrations. Southern Baikal (within the boundaries of the South Baikal climatic district) differs from the rest of the lake Baikal is much deeper and has a very narrow coastal strip. On this part of the lake, the signs of a large mountainous very deep-water body of water with a peculiar fauna of birds are clearly manifested [11]. The peculiarities of its de-

velopment by the most massive and widespread species, which is the Mongolian Gull, is of undoubted interest.

Area of work, material and methodology. Physical and geographical features of the lake. Baikal can be divided into three climatic areas: South Baikal, Middle Baikal and North Baikal climatic districts. They differ in the severity of climatic conditions - it noticeably increases from south to north (the coefficient of continental climate according to Zenker increases from 62 to 64) [1]. At the same time, the division of the lake Baikal into three sections (South, Middle and North), performed by N.G. Scriabin's [23], does not coincide with the boundaries of climatic districts. Therefore, our similar names for different parts of the lake Baikal does not reflect its previous division and gives ornithological characteristics of the corresponding climatic districts.

The composition of the fauna and the number of birds of lake Baikal changes significantly in high-water and low-water years. The summer season of 2021 was characterized by strong high water levels, caused by prolonged, frequently repeated and prolonged rains, sometimes with heavy rainfalls. For p. The Selenga at that time was characterized by a very strong flood - the entire lower and part of the middle delta was flooded. If the Irkutsk hydroelectric power station had not carried out the passage of water in an emergency mode, it would have gone completely under the water. All sandy and pebble shallows along the coast and hag (the sandy spit separating the shallow sores of the Selenga river delta from the deep-water part of Lake Baikal) were flooded. However, the spit in the area of the Posolsky Sor, having greatly decreased in size, has survived, clearly marking the coastline of lake Baikal.

As a result of field work from July 29 to August 5, 2021, we surveyed the coasts of Southern and, partly, Middle Baikal (the Selenga river delta, the mouths of the Bolshaya Goloustnaya and Buguldeyka rivers, Posolsky sor and Proval bay) using the SRV "Professor A.A. Treskov". From the boat, the coastal line was fully surveyed with outings to the shore during overnight stays and ship lay-offs during strong gale winds. At this time, small species of birds were taken into account, it is impossible to count and determine which from a boat even when using binoculars. The survey of coastal birds was carried out using 12x binoculars throughout the entire period of the vessel's movement along the coast.

The Mongolian Gull, like other species of coastal birds of Lake Baikal, assimilates water areas with depths of up to 10 m during the search for food. At the same time, the depth of the lake is very sharp and the zone of coastal shallow waters is insignificant here. According to N.G. Skryabin's [23], it is only about 7.0% of the entire area of this huge lake, i.e. the area that birds can effectively master during the feeding period is very limited, which requires them to constantly stay at the edge of the coast. During the work on this section of Lake Baikal, 122 sightings of the Mongolian gull were recorded, and only one was recorded at a distance of 1500 m from the vessel. The average

longest detection distance of the Mongolian Gull, found far from the coast, calculated as the geometric mean of all encounters [18], is from 171.8 m to 235.3 m. Exploring the coastal strip of 2 km (from one side 500 m for a detailed survey of the coast , and from another 1500 m of the water area of Lake Baikal), we actually count all birds, carrying out their absolute count. Occurrences of gulls at a greater distance are rare and were observed by us when crossing the lake Baikal from one coast to another (once in 7 crossings) before the storm. At a distance of about 10 km from the edge of the cape near Babushkin, 6 flocks of Mongolian Gulls were recorded, among which single individuals of the Common Gull *Larus canus* and Heuglin's Gull *Larus heuglini* were recorded. The birds kept in flocks on the water, gradually moving in short flights to the opposite shore.

The calculation of the average density of the bird population was carried out on the basis of general recommendations for counting birds by route method [20]. For seated and flying birds, it was carried out separately, and then the data obtained were summed up. The average speed of the research vessel was 17.0 km / h, and when counting on the shore, the speed of the surveyor was taken equal to 3.0 km / h. The width of the counting strip was determined on the basis of the geometric mean of all the detection distances of the Mongolian Gull. The error in determining the population density of the species under study is well related to the number of its meetings during the period of census work. To obtain an acceptable error value, it is necessary to have 15-20 sightings of each bird species. In such cases, it is equal to 0.3 ind./km^2 and this accuracy is sufficient if the average density of the bird population is a whole number (from 1.0 ind./km^2 and more).

The total length of the survey routes for the period of work was 577 km and their scheme is shown in the figure. At the initial stage of the work, a census of birds from the r.p. Listvyanka to the town of Slyudyanka, and then, under the other bank, a route was laid to the towns Baikalsk and Babushkin, and further to Selenga river delta (Proval Bay). During periods of severe storms, the ship defended at night in the Bolshaya Goloustnaya river delta and twice at the Buguldeiki mouth of the river (once a day). The peculiarities of the species distribution over the area and on Lake Baikal are given according to the latest reports from Russia and Siberia [4, 21-22].

Results. Characteristics of habitats of coastal birds of Lake Baikal is given by N.G. Scriabin's [23] and he distinguishes two groups of stations characteristic of this lake. **The first group of stations is the open deep-water part of Lake Baikal.** It covers a part of the lake with depths of more than 10 m, and its area is about 93.0% of its entire water area. However, in the life of coastal birds, this part of it is practically irrelevant [23]. Some species of birds are found here only occasionally, but the reasons for their appearance are usually accidental (rest during migrations). **The second group of stations includes the coastal shallow waters of Lake Baikal, with an adjacent strip of the coast.** In this group of stations, there are three well-defined habitats (stations) of coastal birds:

1. Coastal open water area of Lake Baikal. This is a strip of shallow waters (with a depth of less than 10.0 m), encircling, only occasionally interrupting, the deep-water areas of the lake. Along the western coast of the lake, it is well pronounced in the southern part of the Maloe More Strait and in the gubs of the Olkhonskiye Vorota. However, along the eastern coast, bordered by the narrow Baikal plain, it is well developed. The distribution of birds is often determined by the prevailing winds - they concentrate on the leeward side of large headlands. This type of habitat is very poor in vegetation, but rich in animal food, especially on stony soils [5, 23].

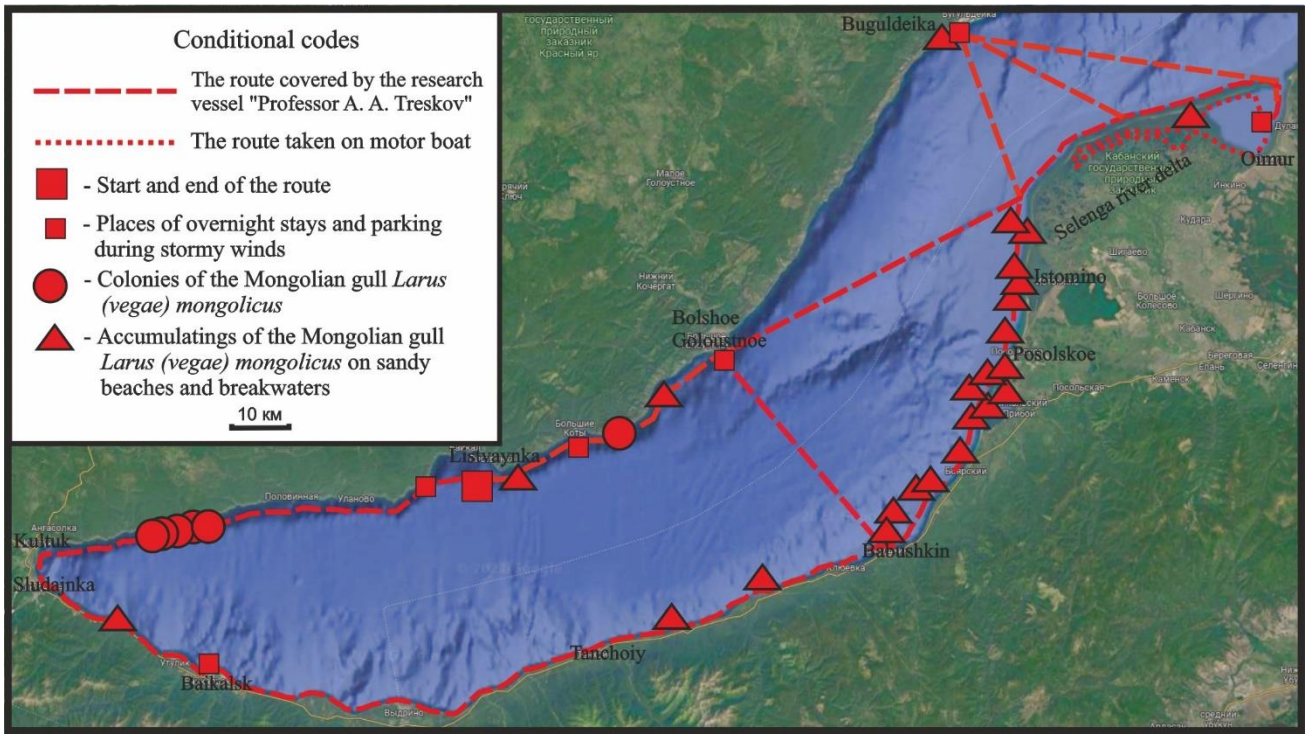

Fig. Sections of the Lake Baikal coastline surveyed with the SRV “Professor A.A. Treskov” at the end of July-beginning of August 2021

2. Shallow, closed and sheltered lips and bays. This station includes only internal parts of the lips and bays closed from the influence of wind and waves. In terms of habitat, they somewhat resemble lakes and, especially, litters. There are no such stations on the western coast of South Baikal, but on the eastern coast they are noted at the mouths of rivers flowing into it. On the western coast of Middle Baikal, they are more common, but they are found in rare spots in areas with a strongly indented coastline. They are characterized by good development of submerged aquatic vegetation and animal feed [5, 23].

3. Sections of the coast with rocky, steep shores. This station is typical for the entire southwestern coast of Lake Baikal. Usually these are clamps, scree and cliffs, steeply descending to the water of the coast. They are covered with rare trees of Common pine *Pinus silvestris*, Siberian pine *Pinus sibirica* and Siberian larch *Larix sibirica*, Drooping birch *Betula pendula* and shrubs: Dog-rose (rose hip) *Rosa acicularis*, Spirea average *Spirea media*, Cotoneaster brilliant *Cotoneaster lucidus*

and Black cotoneaster *Cotoneaster malanocarpa* and, very rarely, Altai honeysuckle *Lonicera altaica* [23]. This station is rare on the east coast.

The Mongolian Gull dominates the coast of Southern Baikal everywhere and the average density of its population is 16.0 ± 0.1 ind. / km^2 or 48.2% of the total number of birds [11]. The main colonies of this species are located here on a small area of very steep rocky slopes-capes (from 144 km of the Circum-Baikal railway to the Piylovka station). Here, five colonies from 8 to 25-50 nests were counted, the largest being 60 nests located on rocky cliffs protruding towards Lake Baikal, covered with petrophilic vegetation. The actual size of the colonies during the period of mass nesting of birds was undoubtedly larger. However, during the census period, a significant part of the birds stopped nesting, although many of them still kept in the areas of the colonies. At the end of July, there were already single young birds that had risen “on the wing”, but most of them had not yet flown and kept on the water at the foot of the rocks occupied by nests. In addition, Mongolian Gulls were observed still incubating clutches. In recent years, such cases, characterized by high mortality of clutches as a result of “compulsive” (unmotivated eating of eggs and downy chicks of their own species) predation [9-10, 12-13], are not uncommon. Repeated and also third attempts at nesting of individuals that have lost their first clutches on Lake Baikal are a common event [11, 13-14].

The distance between the colonies ranges from 500 to 800 m and, in principle, they can all be considered as subcolonies of one large settlement of the Mongolian Gull (fig.). A similar small colony of this species (8 nests) was recorded on the western bank of the Baikal near the Chayachye rock or Devil's bridge (near the village of Bolshiye Koty). On the eastern shore of Lake Baikal, no colonies of gull birds were found even in Selenga river delta. The main reason for this is the sharp rise in the water level as a result of prolonged rains and the melting of snowfields in the mountains. The entire lower and main parts of the middle delta were flooded.

However, along the entire eastern coast of South Baikal, there were common accumulations of these birds, resting on sandy beaches or breakwaters protecting the railway track of the East Siberian Railway from erosion (fig.). All species of large gulls and the great cormorant *Phalacrocorax carbo* fed here, which indicates a high abundance and availability of food resources. The sizes of aggregations varied significantly and in the Mongolian Gull varied from 20 to 320 birds. They were located in areas inaccessible to humans - quite far from settlements (10.0 km or more). It is characteristic that such clusters in the Selenga river delta, common here earlier on hags and in the mouths of large channels, we did not observe this season. It is clearly seen that all the flocks of resting birds were located in areas inaccessible or remote from human settlements.

Under normal conditions, the Mongolian Gull nests in these places as well. In this part of the Posol’skiy sor and the Selenga river delta has large colonies (up to 250-300 nests) of this species. A large number of birds found during the survey period (fig.) Indicates that the Mongolian Gull began

to nest here, but its colonies were flooded during the flood. At the same time, the high concentration of birds underlines the significant abundance of food in this part of Lake Baikal at the end of summer. Undoubtedly, birds that lost their clutches in the first half of the nesting season and did not start re-nesting in other places are concentrated here.

Nesting colonies of this species on South Baikal were located in the areas of large settlements - the town of Slyudyanka and the village of Kultuk. This indicates that most of the birds in this part of the lake use anthropogenic forages to feed their chicks. Numerous works and our special studies show that all species of coastal birds nest in the maximum proximity to the main source of food [6-10, 13]. Consequently, the absence of colonies in places of food concentrations of birds indicates a lack of areas here that are well protected from predators and, above all, humans. On both banks along the edge of the lake Baikal is crossed by railways, there are a large number of small stations and there is a large flow of tourists. That is why all the colonies are concentrated on South Baikal in one place, where steep areas, which are difficult to reach even for humans, often with outcrops of rocks, provide the birds with safe nesting. Birds escape from smaller terrestrial predators, using special defensive reactions - aggressive diving raids, often ending with a blow of the predator with a bend of the wing, paw or beak. At the same time, for the main part of the birds, intimidating raids with a characteristic cry and spraying with caustic foul-smelling droppings are more characteristic.

Judging by the number of chicks on the water in the area of nesting sites, the breeding success of birds was very low - from 10.0-15.0% to 20.0-25.0% of the eggs laid in different colonies. The same is noted by other authors [17-18]. Earlier, a significantly higher breeding success of this species was observed here. A survey of a small colony that existed on South Baikal in the 70s of the last century [2-3] in the 80s showed a high reproductive success of the species - 1.3-1.5 chicks per pair (own unpublished data) and it was underestimated by us, since at the time of the survey the first chicks had already risen on the wing and left the colony. The accumulations of young birds in the bay near the village of Kultuk, found by us at that time, most likely belonged to individuals from this colony.

The high breeding success of the Mongolian Gull at this time was also noted by other researchers - up to 1.89 fledglings per pair [15-17]. At present, the breeding success of the species is minimal. According to the literature, in a number of large colonies of the Maloe More Strait, where it is the most abundant species, the nesting success of the species did not reach 0.1 chicks per breeding pair [18]. A significant drop in the reproductive potential of this species in the modern period is confirmed by the observations of other authors [14, 19]. The same authors point to the obvious starvation of chicks and confirm the wide development of cannibalism in the Mongolian Gull directed at young birds [19]. The development of this phenomenon was previously traced by us in the Selenga river delta, but in the second half of the XX century it was not widespread [7-10, 12-13]. Now it is the usual feeding strategy of large gulls and, first of all, the Mongolian Gull [18]. Additional evi-

dence of mass starvation of birds during the nesting period is the change in the ratio of different types of food. Earlier, at the beginning of the nesting season, aquatic insects were found in the feed of this species, and locust at the end of the nesting season, but fish clearly predominated [24-25]. At present, the share of insects in the diet of this species has increased sharply, and fish has significantly decreased [14, 19].

The strong overfishing of fish, which has been observed in recent decades, has greatly reduced the abundance of forage resources of the Mongolian Gull. The feeding situation has deteriorated sharply and due to the massive appearance on the lake Great Cormorant lake Baikal. The Mongolian Gull is not capable of active fishing and is a gatherer, i.e. picks up weakened, sick, heavily worm infested and dead fish from the surface of the water. At the same time, she masterfully pulls fish out of the nets, and this feeding method was most often observed among the large species of gull birds of Lake Baikal. Young birds quickly mastered it, imitating adult experienced individuals. The massive development of network fishing and the high availability of very cheap Chinese-made nets contributed to the rapid depletion of fish stocks in the lake Baikal.

Discussion. The Mongolian Gull is one of the most numerous bird species of Lake Baikal, found almost everywhere. At the same time, the species structure of birds in the immediate coastal area of Lake Baikal is rather limited, and only a few species reach high numbers here [11]. A high abundance and diversity of birds is characteristic of the entire Baikal basin (from the water's edge to the peaks of the highest mountain ranges surrounding the lake), and its water area is rather poor. The main reason for this is the very large depth and very small area of shallow waters (up to 10 m) - only 7.0% of the entire area of its water area. Despite the very high productivity of the lake pelagial and benthal [5], these forage resources are practically inaccessible for birds. Their main consumers are fish of various species [11]. In order to use their resources, a very high specialization of birds is required for active fishing in the water column.

There are very few such species of coastal birds, and on the lake Baikal, their species structure is limited. It includes several species of Merganser *Mergus sp*., Great cormorant, Hump-nosed scooter *Melanitta deglandi*, Black-throated *Gavia arctica* and Red-throated *G. stellata* loons, as well as several species of animal-eating diving ducks. All these bird species use depths up to 10 m, i.e. only 7.0% of its water area. Their number, with the exception of the great cormorant and mergansers, is low, and diving ducks prefer to use even during the periods of migration of the lakes and litter of river estuaries. South Baikal is one of the deepest basins of the lake, in which the area of shallow waters is very limited, especially along the southwestern coast, where often sheer cliffs break into the water and great depths are located right next to the coast.

In this regard, the high abundance of the Mongolian Gull requires a special discussion. First of all, it is an omnivorous species with a very wide range of stations used. However, it is incapable of

actively catching live prey if it is not in extreme situations that limit its activity [8]. At the same time, a strong, even powerful beak creates the prerequisites for its use in killing and cutting prey. Therefore, the Mongolian Gull is able to use almost any available food for food, often collected in the vicinity of human settlements and at tourist camps. The composition of her feed and the methods of obtaining them are unusually wide. This is facilitated by the high level of elementary intellectual activity of this species [7-13]. He, in certain circumstances, easily switches to cannibalism and can overcome the evolutionary prohibition on the use of conspecific individuals for food.

Depending on the current situation, the Mongolian Gull (as well as all species of large gulls) is able to learn to kill weaker individuals of its species, and “compulsive” predation underlies the main part of its specialized feeding strategies. More difficult is the transition to "sophisticated" predation, when birds begin to kill and eat weaker individuals of their species. Nevertheless, some individuals quite easily overcome the species stereotype of behavior, which prohibits the use of individuals of their own species for food. The initial prerequisite for this is the often repeated short-term starvation of birds (2-3 days each) during periods of stormy winds on Lake Baikal. On such days, in the colonies of all species of large gulls, a large number of downy chicks die from hunger and hypothermia. After the end of the storm in the surveyed colonies of gulls there are a lot of their corpses, but after one and a half to two hours all of them are collected and eaten by birds prone to cannibalism [7-13].

Conclusions

At the heart of the high number of Mongolian gulls on the lake. Lake Baikal has a high lability of the feeding behavior of the species associated with its omnivorousness, up to the use of plant feed for food (grain products in poultry farms with semi-free content of poultry). The composition of its food is very diverse (from plant to animal) and it easily adapts to living next to humans. A high level of elementary rational activity and the ability to solve non-ordinary tasks, along with a strong and sufficiently powerful beak and large sizes that allow butchering corpses, makes it possible to easily overcome the ban on the use of individuals of their own species for food. In this regard, cannibalism is one of the widespread feeding strategies of the species under conditions of an acute shortage of basic forages. That is why this species in the modern period retains a high number, and the complex age structure allows it to maintain a sufficiently high abundance for a long time in unfavorable environmental conditions.

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