State Nature Reserve «Bastak» (Russia)

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Summary

The article provides information about the history of the creation of the Reserve «Bastak» the most valuable natural objects, natural environment, biodiversity and the role of the Reserve in its preservation.

Key words: the Bastak Reserve, Jewish Autonomous Region, Russian Far East.

«Bastak» state natural the Reserve is located in the southern part of the Russian Far East, on the territory of the Jewish Autonomous Region (Fig. 1).

«Bastak» natural reserve was founded in January, 1997 in order to provide, maintain and preserve the reserve's unique and typical natural complexes; to launch activities for forests' protection, to organize and conduct environmental education of the population; to develop and implement scientific methods of environmental protection, and to perform environmental monitoring.

The territory of the Reserve is represented by two plots. The main one is located 17 km north from the regional center - the city of Birobidzan - to the administrative border of Jewish autonomous region - Khabarovsky Region. Its territory covers the south-eastern spurs of Bureya mountain ridge and the north-western outskirts of Sredneamurskaya lowland.

The reserve extends for 47 km in a latitudinal direction and 38 km along longitude.

The extreme points of the reserve have the following coordinates: the southernmost point – 48 51'N, 133°09'E.; the northernmost point - 49° 14'N, 132°59'E.; the easternmost point - 49° 02'N, 133°16' E, and the westernmost point - 49°01'N., 132°50'E. The total length of the Reserve's boundaries is 176 km,

including 58.5 km along the border of Khabarovsky Region. The area of protected territory is 91,771 ha. In 2002 and 2003 a conservation zone was created along the borders of the reserve. The conservation zone occupies 15,390 ha in the Jewish Autonomous Region and 11,160 ha in the Khabarovsky region.

Fig. 1. Location of the Reserve «Bastak» (by A.N. Gelunov)

The main characteristic of the reserve's location is its position on the eastern edge of Bureinsky mountain ridge and in the north-western part of Sredneamurskaya lowland. Due to this fact, there is a variety of plant communities. Moreover, reserve status allows protecting the entire basin of the Bastak River. The most valuable objects of protection include pine-broadleaved forests near the northern border, rare bird species, such as Far Eastern crane, hooded crane, and others.

Cluster plot «Zabelovsky» was created by the Government Order in 2011. The cluster territory is situated on the south of the

Russian Far East and in the eastern part of the Jewish Autonomous Region (the Smidovichsky area).

Protected area is limited to the floodplain of the middle current of the Amur River, and is located in the eastern part of Sredneamurskaya lowland (Fig. 2). The cluster *stretches for 14 km in the latitudinal direction, and 41 km along longitude.*

The total length of Zabelovsky border is 104 km, including 41 km on the left bank of the Amur River. The area of the cluster *is 35,323.5 ha, including 6,911.8 ha of forest covered lands, 5,611.4 ha of marshes, 19,185.8 ha of meadows, 3,098.5 ha of the water areas (excluding the part of Amur River), 493.1 ha of anthropogenic lands, and 22.9 ha of sands.*

The territory is limited to an average altitude of 43 m above the sea level. The plain's height varies from 48 m in the northern part up to 37 m at the eastern border on the banks of the Amur River. The end points of the cluster area «Zabelovsky» have the following coordinates: the northernmost point – 48° 30'N, 134° 20'E; the southernmost point – 48° 18'N, 133° 58'E; the easternmost point – 48° 25'N, 134° 30'E, and the westernmost point – 48° 23'N, 133° 57'E.

The total area of the reserve is 127094.5 ha, including 72,662.0 ha in Obluchensky district, 35323.5 ha in Smidovichsky district and 19,109.0 ha in Birobidzan. The area of the conservation zone totals up to 26650 ha.

A major East Asian flyway passes through the territory of the cluster, located in the eastern part of the Amur River basin. On the territory of the cluster 213 bird species were observed, representing approximately 65% of the avifauna of our region. During spring, summer and autumn bird species of the Arctic steppes and other natural zones can be observed.

In spring and autumn big waterbird flocks use cluster's territory as a key staging point (to feed and rest) on their long-distance migrations. Rare bird species can be noted during migration period, such as: japanese crane (*Grus japonensis* (Muller, 1776)), far eastern curlew (*Numenius madagascariensis* (Linnaeus,

1766)), far eastern crane (*Ciconia boyciana* (Swinhoe, 1873)), hooded crane (*Grus monacha* (Temminck, 1835)), black stork (*Ciconia nigra* (Linnaeus, 1758)), golden eagle (*Aquila chrysaetos* (Linnaeus, 1758)), etc.

Flora of higher and lower plants of Bastak reserve includes 1,883 species, *involves* 750 species of fungi. There are 89 species of plants and fungi included in the Red Book of the Jewish Autonomous Region. Among them there are Korean pine (*Pinus koraiensis* Siebold et Zucc.), Komarova lotus (*Nelumbo komarovii* Grossh.), peony (*Paeonia*), wolfsbane (*Cypripedium*) and other rare species.

Fauna of «Bastak» natural reserve is represented by 2,296 animal species, where there are 1,908 species of invertebrates and 388 species of vertebrates (mammals - 53 species, birds - 266, reptiles - 4, amphibious – 7, fish - 58). Among them there are 60 species listed in the Red Book of the Jewish Autonomous Region. Rare species include such species as Chinese perches (*Siniperca chuatsi* (Basilewsky, 1855)), Far East turtle (*Pelodiscus sinensis* (Wiegmann, 1834)), white-tailed eagle (*Haliaeetus albicilla* (Linnaeus, 1758)), mandarin duck (*Aix galericulata* (Linnaeus, 1758)), the Siberian tiger (*Panthera tigris altaica* (Temminck, 1844)) and others.

Relief. The territory of reserve is notable for varied relief. Its formation is caused by the combination of two tectonic structures: ancient crystallized Bureya mountain-massif and Sikhote-Alinskiy folded system. As a result the territory of reserve is divided into two approximately equal parts: mountain and plain. Mountains occupy north-western part of Reserve; they represent south-eastern spurs of vast Khingano-Bureya mountain system. According to its height, genesis and structure they relate to fold-block low and middle mountains with the intrusion of magmatic stratum. The mountain ridges stretch along the meridian that is the specific feature of Far East mountain systems and may be explained by their simultaneous formation.

Mountain ridges are stretched along the meridian which is common with the mountain systems of the Far East and can be explained by their universal formation. The Bureya Ridge is divided into the

number of mountain-masses of which Bydyr mountain-mass is located on the territory of Reserve. Middle mountainous relief with the predominance of more than 800 m heights extends in the northern part of the Reserve. The highest mountains are Bydyr (1207 m), Tukolaly (1103 m), Balyabinskaya (893 m). Well-defined watersheds, steep slopes and deep river valleys with plane bottoms are typical for this relief (Fig. 3).

To the south the mountainous relief lowers up to 400-500 m and lower. The main low mountainous tops of Reserve are Kamenushka (668 m), Skalistaya (636 m), Kruglaya (451 m), Osinovaya (413 m), Dubovaya (210 m). This part has the features of hilled country with indistinct watersheds, little rise of plane and rounded tops above wide valleys.

In the central part of reserve mountainous relief changes gradually to the plane surface of the Sredneamurskaya lowland. It has alluvial origin and consists of clays, loams, sands and pebble deposits. The height of valley changes from 200 m at the foot of mountains to 70–80 m at the south-eastern border of Reserve. Low-lying relief is complicated by numerous forested accumulative ridges and lowlands stretched along the ancient river banks.

Climate. Accordind to the B. P. Alisov's climatic division [1] the Reserve is included into Middle Amur Province of monsoon climatic area. The north of reserve (Mt. Bydyr and its vicinities) is a part of Bolon climatic district, and other part belongs to the Lesser Khingan climatic district. Climate of reserve is ultracontinental with distinct monsoon processes. Air masses bring the East Asian and South East Asian monsoons in warm seasons, and the continental air masses from the Central Asia and Eastern Siberia towards the Pacific ocean in cold seasons.

The abundant rains in summer and small overcast in winter is closely connected with main directions of winds in different seasons. But at the same time, a great distance from the ocean (about 500-600 km) as well as the structure of the relief determine the climate and make some diverse features.

The winter weather in the Reserve has high atmospheric pressure, which is influenced by the Asian anticyclone. The north-western and northern winds are predominating. They bring cold and dry air from the deep continental areas, defining cold and low snow winter with clear and almost cloudless weather.

In summer the precipitatios *is 70-85%* of average annual amount ranging from 670 to 7500 mm per year. The most humid areas located in the sources of Trek, Kirga, Bastak and Bydyr rivers receive 1100-1200 mm precipitation per year. The most humid period is second half of summer, the most dry period is winter.

The relief significantly affects the climate. Especially, it is expressed in the character of precipitations' allocation, in the phenomena of plant elevation zoning, and temperature inversion, in the level of solar radiation, and also in the direction of the air mass moving. The temperature drops at rate of 0,6–0,9°C per 100 m from 600-700 m above sea level.

The average annual air temperatures are 1,5°C (on the northern border of the Reserve), and 0°C (on it's southern border). July is the warmest month of the year, with monthly average temperature *in the southern part of the Reserve is +20°C.* It is necessary to note that the average temperature of July in the upper mountain belt of Reserve is not higher than +18°C. The absolute maximum is +40°C. The coldest month of the year is January, with monthly average *temperature is –23°C (–28°C in mountains).* The absolute minimum achieves –50°C in narrow valleys of upland areas of Reserve, where the very cold and over-frost weather can occur in the winter mornings.

Early autumn frosts are observed in the third ten-day's period of September; late spring frosts occur in the second ten-day's period of May. Late spring is caused by two main factors: influence of cold Arctic air masses and relative proximity to cold Sea of Okhotsk up to 120–135 days, affecting Middle Amur lowland.

The frost-free period (over +10°C) continuesup to 120–135 days in the average. The duration of a growing season (warmer than

0°C) depends on the elevation above sea level, and lasts up to 190–200 days with summarized temperature is 2000–2500°C.

Winter start in the first ten-day's period of November, when the average daily temperatures are below 0°C. When winter begins the temperature drops fast. The snow covers the ground during 125–170 days. [4]. The snow height reaches 40–50 cm. Low temperature in the winter and low snow level promote the deep soil freeze (reaching 150–200 cm) that detains plant growth, and due to the late ground thawing results in bogging in lowlands.

As a whole, the climatic conditions are quite congenial for abundant floristic composition of arboreal and herbaceous vegetation.

Hydrographic status. Hydrographic network is much ramified. All rivers of the Reserve are included in the Amur River basin, namely two the first order inflows of Amur (Bira and Tunguska Rivers). The Mountain Rivers are predominant in the Reserve, except the ones of the southeast part of the Reserve.

The main streams (rivers and brooks) have the length less than 10 km each. There are few lakes with the water surface up to 1 km^2. The river net is well developed in the mountain part and less developed in the plain part of the Reserve. In the mountain part the river net density is considerable, every square kilometer of land surface has 0,7-0,8 km of river net. The biggest rivers are the Bastak (the length within the Reserve is 63 km), In (64 km), Bol'shoy Sorennak (43 km), Glinyanka (35 km), Kirga (31 km), Ikura (26 km) (Fig. 4).

Big rivers flow mainly from the north-west to the south-east and from the north to the south, crossing both mountain and plain parts of the Reserve. The character of the upper flow of the most rivers is typically mountainous with irregular discharge and high coefficient of outflow. The rivers' upper parts have narrow stony valleys; their beds are often stepped with a lot of fords. The character of rivers changes in their middle flows, the speed decrease, fords disappear. In their lower flows the rivers become calm, very meandering, and slow.

The spring flood is not expressed. The main causes of inundation are monsoon rains. At that time water runs over the slopes overfilling rivers beds, submerging the plain. Flat parts are flooded for a long time or in the condition of over wet, which causes their bogging. The lakes are located exclusively on plain (exogenic origin). The forming of flood-plain lakes is connected with erosion-accumulation activity of rivers, and spring ice drift. In a cluster Zabelovsky there is one of the largest lakes in the Middle Amur region, connected to Amur River by channel.

The permafrost are distributed everywhere on bogged plains of the Bastak, Greater Sorennak and Glinyanka Rivers basins.

Vegetation. According to the geobotanic zoning of the Far East [2] the terrain of the Reserve is included into the Lesser Khingan mountain district of cedar pine-broad-leaved with spruce and cedar pine-spruce forests, which is the part of the Manchurian continental province of cedar pine-broad-leaved and oak forests of Far Eastern coniferous-broad-leaved area, which change to the outlying districts of the Middle Amur plain with oak and parvifoliate (birch and aspen) forests with larch, reed grass meadows and sedgy low moors.

At detailed elaboration of Lesser Khingan district was made by G.E. Kurentsova [3] on the territory of JAR, the terrain of the the Reserve is referred to Sutara-Pompeevskiy area of broad-leaved-spruce-pine forests and their derivatives and to the In-Bira lowland area of bogged larch light forests in a combination with wetlands, moors and wet reed grass-sedgy meadows.

The basic types of vegetation in the Reserve are forest in the northwestern part and meadow in the southeast. The green moss fir-groves with stone birch (*Betula lanata* (Regel) V. Vassil.) and Siberian juniper (*Juniperus sibirica* Burgsd.) prevail at the north border of the Reserve on the highest slopes. The most valuable formation is pine-board-leaved forests which grow at the average level of mountains (Fig. 5). Oakeries, larch forests, birch forests, lime-tree forests are distributed in the southern and western parts of the territory. The plain part can be described as the complex of

wetlands covered by sedges and various types of grass (sedge and moss bogs with tussocks, sometimes with sparse larch forests or bushes) (Fig. 6). The vegetation cover is formed by representatives of Manchurian, Okhotsk and eastern Siberia floristic regions [5].

Since 2007 the reserve has become a home to a Siberian male tiger, and in 2013 a tigress was also moved here (Fig. 7). Food supply allows these animals to live in the reserve.

The establishment of «Bastak» natural the Reserve have positive affected conservation and restoration of plant and animal communities. Protected territory excluded from economic activity has a great importance for the conservation of biological and landscape diversity, the restoration and the maintenance of renewable biological resources in the surrounding areas, providing a favorable environment both at the regional and the national levels.

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Приложение.

Fig. 2. Area cluster plot «Zabelovsky» of reserve «Bastak»
(Photo T.A. Rubtsova).

Fig. 3. Gornotundrovyh grouping of mount Bydyr in reserve «Bastak»
(Photo V.V. Gribkov).

Fig. 4. River Bastak - the main river of reserve «Bastak»
(Photo T.A. Rubtsova)

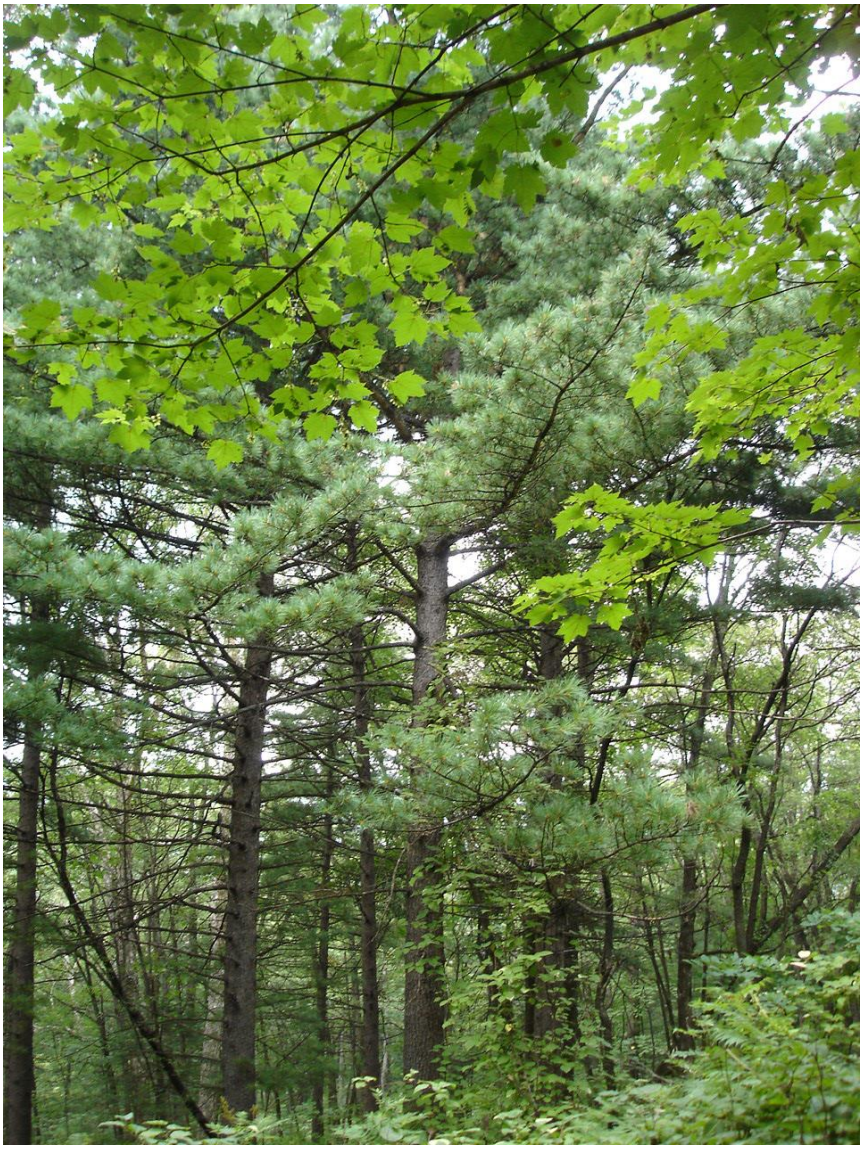

Fig. 5. Pine-board-leaved forest in reserve «Bastak»
(Photo T.A. Rubtsova)

Fig. 6. Lowland meadow-marsh reserve «Bastak» (Photo A.V. Kliuev)

Fig. 7. Tiger Zolushka in reserve «Bastak» (Photo from the photo-traps)