

Arum korolkowii Regel endangered

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Abstract

The disappearance of any kind of plants or animals is a step towards such a sad future, it is the loss of a priceless gift of nature. To prevent such things, it is necessary reserves, sanctuaries, zoos, botanical gardens and, of course, the joint efforts of people from all over the world: scientists, politicians, industrialists. However while we are procrastinating, we can simply open the "Red Book of Kazakhstan" and get to know more closely those amazing animals and plants of our country that may disappear today and one of these plants is Korolkov's Aronnik, we want to tell the whole world about it. This plant grows in the shade of trees, among rocks, along shady gorges to the mid-mountain belt of Central Asia, Northwestern China and Iran. In 1877, it was described in the St. Petersburg Botanical Garden from cultivated specimens. It is named after N.I. Korolkov, who brought tubers for the first time.

Keywords: Arum korolkowii; red book, species, germination, poisonous, blooms, tubers, berries.

INTRODUCTION

Plants surround us everywhere: in the forest, in meadows, in the mountains, on seacoasts and even in deserts, we decorate our homes with them. The plant world is so rich and diverse that a person would not have enough of a lifetime to comprehend its splendor and master knowledge to the fullest (Gorchakovsky *et al.*, 2017). Moreover, between this splendor and diversity there are those who need our protection and protection. Such plants are included in international, national and regional Red Books, as well as in the Red Lists of Rare and Endangered Species. Each of us can make his own contribution to the protection and protection of rare and endangered plants (Velidov *et al.*, 2021)

Kazakhstan is rich in natural gifts, especially beautiful and diverse flora. Forests, beautiful flowers, medicinal herbs. Nevertheless, many rare plants from the

Red Book are on the verge of extinction. The International Union for Conservation of Nature has determined the gradual death of the animal and plant world. In this regard, the idea arose to study each plant individually from the list of the Red Book of Kazakhstan, which are under threat. Red Book representatives need to be known in order not to commit irreparable through ignorance. In addition, the first of the plants we had the opportunity to study Aronika Korolkova from the list of red book plants (Morozova *et al.*, 2016)

Resolution of the Government of the Republic of Kazakhstan dated October 31, 2006 No. 1034 approved a new list of plants listed in the Red Book of the country. The list includes 373 species of plants, 13 species of fungi and one species of lichens.

Among them, Korolkov's Aronnik can be found among the rocks and shady gorges of Central Asia, China, Iran.

This plant has a spherical, slightly flattened tuber. The leaf blade has a triangular or heart-shaped lance-shaped shape. The petiole on which the leaf is located is twice as long as the plate. The stem in red stripes reaches a height of 60 cm. the green blanket is rolled into a rather narrow tube. Its length is twice the length of the cob, the color is green outside and whitish inside. The reddish cylindrical appendage is twice as large as the cob. Surprisingly decorative are not only the inflorescences, but also the red spherical fruits of the Aronnik Korolkov, which are in time for autumn (Nikitsky *et al.*, 2016).

Aronnik grows very slowly, prefers drained, loose, fertile substrates without excess moisture. Prefers shady places (under trees, on the north side of buildings). In winter, it is recommended to cover the plant with a layer of leaves (Gorchakovsky *et al.*, 2017). This plant reproduces vegetatively and by seeds. Korolkov's Aronnik contains a number of alkaloids that are very toxic, for example, aronin — locally irritates, especially mucous membranes, although it is a volatile substance, paralyzes the central nervous system. The tubers of the plant are more poisonous (Cherkasova *et al.*, 2010).

Korolkov's Aronnik — *Arum korolkowii* Regel Northern Iran, Afghanistan, Central Asia, Northwest China. Perennial herbaceous plants up to 50 cm in height. Tubers are spherical, somewhat flattened. Leaves up to 16 cm long, 13 cm wide, heart-shaped-lance-shaped or triangular, appearing in autumn or in the south in early winter. Petioles up to 35 cm long, with an expanded vagina, green, with brown stripes. Peduncles are longer than petioles, 40-50 cm long, with reddish stripes. The tube covered up to 4 cm in length, narrow, oblong-cylindrical, green outside, green inside, white. The fold of the bedspread is erect, 14-20 cm long, narrow-lanceolate, pointed, green outside, greenish-white inside with a pale purple tint. The cob is up to 14 cm long. The appendage of the cob is up to 30 cm long, cylindrical, purplish-brown at the bottom, dull cream in the upper half with a thick red-brown marble pattern. The berry is red. Blooms in June. Frost-resistant to minus 23 °C. Prefers rocky soils. It is moisture-loving, but relatively drought-resistant. In culture since 1877 Table 1 (Vilesov *et al.*, 2009).

Table 1

DEPARTMENT	Angiosperms – Magnoliophita
Monocotyledonous	CLASS – Liliopsida
Araceae FAMILY –	Araceae Juss.
GENUS Aronnik –	Arum L.
Life form	Herbaceous perennials
Plant height	50 cm
Flowering time	May
Light - loving	Shade - tolerant
Drought resistance	Hydrophilous
Durability	None
The need for shelter for the winter	None

Cultivation is possible only in protected soil	None
Extent of distribution	Rare

Clinic for poisoning with Korolkov's Aronnik: Lacrimation, sore eyes, runny nose, salivation, nausea, vomiting, abdominal pain. With resorption, the work of the heart is disrupted (effects on the conduction system) — tachycardia, arrhythmia; depression of the central nervous system (lethargy, adynamia, loss of consciousness), coma, death from paralysis of the respiratory and vasomotor centers.

Treatment for poisoning with Korolkov's Aronnik (figure 1): Gastric lavage with the addition of activated charcoal, saline laxative, oil anesthetic-tetracycline emulsion (injected through a probe).

Cordiamine, caffeine — under the skin, 2% promedol solution — 1 ml into the muscle. Intravenously: sodium bicarbonate, sodium chloride, polyglucine, Ringer-Locke solution, lasix, vitamins B1, B6, B12, C, forced diuresis.

In case of severe poisoning — intubation, artificial ventilation with oxygen, blood replacement surgery, hemodialysis (Dikareva *et al.*, 2014). Cardiovascular drugs — according to indications.



Figure 1. Aronnik Korolkov

Aronnik bears its name in Latin thanks to the word "aron" in Greek, which the famous naturalist and versatile scientist of antiquity Theophrast (approximately 370 BC — 288-285 BC) in his writings named one of the species of this genus. Often the plant is called in accordance with the transliteration Arum or "arum beard", "snake-grass" and similar unflattering epithets, since the fruits of the plant are very poisonous.

Arum is the owner of horizontally growing rhizomes with tuberous outlines of a hemispherical or ovoid shape. These perennial grasses are small in size, rarely exceeding 60 cm in height. They have a period of rest. At the same time, their foliage begins to develop only when the flowering process is completed. A large number of leaf plates are formed, they are usually arranged in a spiral order on the stem. The leaves have sheaths, and there are 2-3 leaves with petioles. Leaf sheaths can vary in length from short to elongated. The petiole at the base is distinguished by an extension resembling a vagina. The shape of the leaves can vary from heart-shaped to arrow-like or arrow-lance-shaped. On the surface of the leaf, the primary veins of feathery outlines and they can form at least one single common one, a pattern resembling a mesh is formed from veins of a higher order.

There is a flowering period on May days, when the soil is already well warmed up under the rays of the sun, but an openwork shade will be provided under the crowns of the trees. On a bare and powerful flower-bearing stem, an inflorescence is

formed, which to many resembles an Arisaema cob (Arisaema) - "sisters" in the family. The cob is made up of small buds, which, when blooming, may have petals of red, bright pink, yellowish or creamy pink color. The flowers are unisexual, devoid of a perianth.

After a short period of time, a leaf-covering bract grows around the cob. Such a leaf has a high density and its parameters can approach 0.5 m in length, reaching 10 cm in width. Such a bedspread has an olive or light green shade, but there are varieties that have a pattern of stripes and specks of other tones on its surface. Nevertheless, inside such a leaf has a beautiful bright purple color. Because of its foliage and inflorescences, the aronnik is very similar to calla lilies.

In the middle of summer, after the flowering is over, and pollinators arrive, which are flies (meat, manure or carrion), and for the variety of Aronica canofoloid are mosquitoes, then the berries ripen. Such fruits are very fleshy, red or orange in hue. Inside the fruit there are several seeds with a shape varying from ellipsoid to ovoid. At the same time, it is curious that with the arrival of August, all the foliage will die off and the plant will have only a peduncle, on which only fruits will be decorated, becoming bright scarlet and glossy.

The place of disembarkation. Since the plant grows in nature under the shade of tree crowns, when planting in the open ground, a flowerbed protected by shading is selected so that the foliage of the trees provides an openwork shade. You can also plant such bushes in the shade of buildings, but there is evidence that they germinate well in the sun.

The soil for planting the aronnik plays an important role. It is recommended to use a calcareous nutrient substrate with

good properties of drainage and penetration for moisture. It is necessary to protect against waterlogging to lay a drainage layer on the bottom of the pit, which can be expanded clay or broken bricks of small size.

Arum planting. The depth of the hole for the "arum beard" should not be more than eight centimeters. It is best when the plants will not interfere with each other by growing, so they are kept up to 40 cm between them. It is important to place the aronnik's branches in the open ground when it warms up well under the sun, and this is possible in the middle or end of May days.

Fertilizers for aronnik are introduced from the beginning of March. It is recommended to use complex mineral preparations twice a month. You can use organic.

Watering. The plant suffers most when grown in the open ground from waterlogging, as the tubers quickly rot. Therefore, moderate watering is necessary, especially in the summer heat. But if the bushes are planted in a shady place, but such soil moistening is not required.

Wintering Arum in the open ground. It is best to organize a shelter for planting for the winter period, using fallen foliage or lapnik, since some varieties, although they have winter hardiness, but in severe winters they can significantly freeze and die. It is possible to use agrofibre for shelter.

Application in landscape design. Aronnik has long been known to phytodesigners for its decorative features. With its help, European flower beds or flower beds are often decorated. It is because of its property to bloom perfectly in the shade, the plant is planted in places where no other representatives of the garden flora can grow normally and even just survive.

Aronnik is originally pollinated: for these purposes, he chose flies, so the smell of the plant is not the most pleasant (and the purple color of the bedspread in some varieties resembles meat). When an insect attracted by a specific aroma sits on the cob, the flower collapses the veil and keeps the flying creature inside for several days at a temperature comfortable for midges +34 ° (according to some sources up to +50 °). Insects feed on the pulp of the inner part of the blanket. As a result, everyone is full, satisfied and pollinated.

Aronnik berries are poisonous (as, indeed, are the rest of the plant). They contain oxalates of saponins, which consist of needle crystals that irritate the skin and mucous membranes and can cause swelling of the pharynx, difficulty breathing, burning pain and upset stomach. Therefore, it is better to take care of the plant with gloves. Interestingly, the birds eat the aronnik berries without consequences and thus spread the seeds.

Important! Since there is a large amount of alkaloids in parts of the aronnik, when growing in the garden, you should choose a place that is not accessible to children. If a person eats such berries, it threatens serious poisoning. However, since the fruits of arum do not have a pleasant taste, it will be difficult for a child to swallow a lot of them. However, after the berries dry out, their poisonous properties are lost.

In nature, several species of *Aronia* germinate, which, due to the possibility of extinction, are listed in the Red Books of some countries. A strange unusual aronnik plant looks grotesque: flowers with a huge blanket, large leaves with spots, scarlet shiny berries, densely sprinkling the stem. This plant is of interest, gardeners like to experiment with planting aronnik on the

site. It is important to know the characteristics of the plant, which in some countries is eradicated as a weed, despite its spectacular appearance (Red Book of Kazakhstan., 2006)

Aronnik spreads by self-seeding, and its growth needs to be controlled. However, how good he is!

The inflorescence is surrounded by a leaf-covering so that it is almost completely hidden in it. Obviously, the elegant appearance of the aronnik inflorescence in the UK is called "Lords and Ladies". By the way, in this country it is considered a weed, since it spreads perfectly by self-seeding and "comes" from the edges of forests and fields to gardens and vegetable gardens.

When the cob blooms, glossy fleshy round red berries with seeds are formed along its entire length. Many gardeners plant an aronnik for the sake of these bunches on the stem – they look so impressive (National Atlas of the Republic of Kazakhstan., 2006).

Official medicine does not use aronnik because of its toxicity and lack of research. Nevertheless, some benefit was derived from it by healers in the 18th and 19th centuries - they used aronnik as a stimulant, mild laxative, diuretic, expectorant.

In Victorian times, in the language of flowers, aronnik meant hot passion due to the shape of the cob and the hot temperature inside the blanket during the pollination process.

In modern folk medicine, crushed aronnik tubers are used externally in a mixture with honey to treat skin problems: ulcers, lichens, and so on. In addition, the tubers of the spotted aronnik are used to treat digestive diseases, rheumatism, neuralgia, respiratory diseases.

In addition, from the tubers of Aronnik Korolkov, a variety common in Central Asia, they make an infusion for potency, homeopathic medicines for diseases of the oral cavity, upper respiratory tract and vocal cords are produced from Aronnik.

Moreover, the Aronnik tubers cease to be poisonous after heat treatment, and earlier, before the appearance of potatoes, they were eaten and used for starching clothes. Moreover, the leaves are for washing, as they contain soapy saponins (Physical geography of the Republic of Kazakhstan., 2010)

Conclusion: Many of the species listed in the Red Book of Kazakhstan meet all the criteria of the international requirement, which increases their vulnerability and conservation value. This work is dedicated to Aronnika Korolkov, and is aimed at taking timely measures to prevent the violation and destruction of the natural and ecological framework because of monitoring species and valuable territories. The preservation of this framework is necessary for the future of the growing generation of our children.

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