

## II. RESEARCH OF FOREIGN AND INVASIVE VEGETABLE TYPES IN THE TERRITORY OF NP RUSENSKI LOM

### 1. Introduction

The presence of numerous settlements within the scope of the Rusenski Lom Nature Park and its location among arable land, long exploited and exploited by man, makes it particularly vulnerable to the invasion of alien invasive species. The dense road network, the valley of the Rusenski Lom river and its connection with the Danube river, provide "favorable" corridors for the invasion and spread of invasive species. An additional element to the flora alien to Lomov is the acacia and starvation cultures created in the past.

The term invasive species includes that part of the alien species of a flora that, under new conditions, is rapidly spreading (displacing and invading territories) and at the same time carries an element of damage by altering, displacing or endangering natural vegetation. The rest of the alien species, which do not have aggressive behavior, are referred to as non-native or unnatural, many of which in most cases occur as incidental elements or only in the places where they are cultivated. Alien species are characterized by abundant seed production, high seed viability, which persists for years, and have effective mechanisms for displacement. They adapt quickly to diverse environmental conditions, but most often occupy habitats similar to those from which they originate. Their successful and rapid displacement is most often due to the absence of their natural competitors.

The emergence of invasive alien species is the result of human activities - transport, tourism, trade, agriculture, horticulture, afforestation. They are extremely aggressive in the habitats of native species, where they significantly alter the soil content, the light regime in the habitat and its structure. Some of the invasive species have a serious impact on human health, causing allergies or other problems with the poisonous substances contained in them. In addition to the negative impact on native flora and vegetation, alien species also cause major economic losses, reducing agricultural and forestry yields and increasing the costs associated with controlling them.

## 2. Presence of alien and invasive species

7 invasive tree and shrub species have been identified in the territory of the Rusenski Lom Nature Park (Table 1), of which 4 belong to the worst invasive plants (Annex 1, 2007). The other 3 species are conditionally categorized as "slightly invasive" and occur as incidental elements along roads, in riparian habitats or near cultivated sites.

There are also 6 invasive herbaceous plants in the Nature Park (Table 2), of which 2 species belong to the group of "worst invasive plants". The rest are categorically classified as 'slightly invasive', although one of them (*Erigeron annuus*) should also be classified at the regional level as the worst invasive plant, due to its widespread distribution and significant deterioration in the habitat quality of riparian meadows.

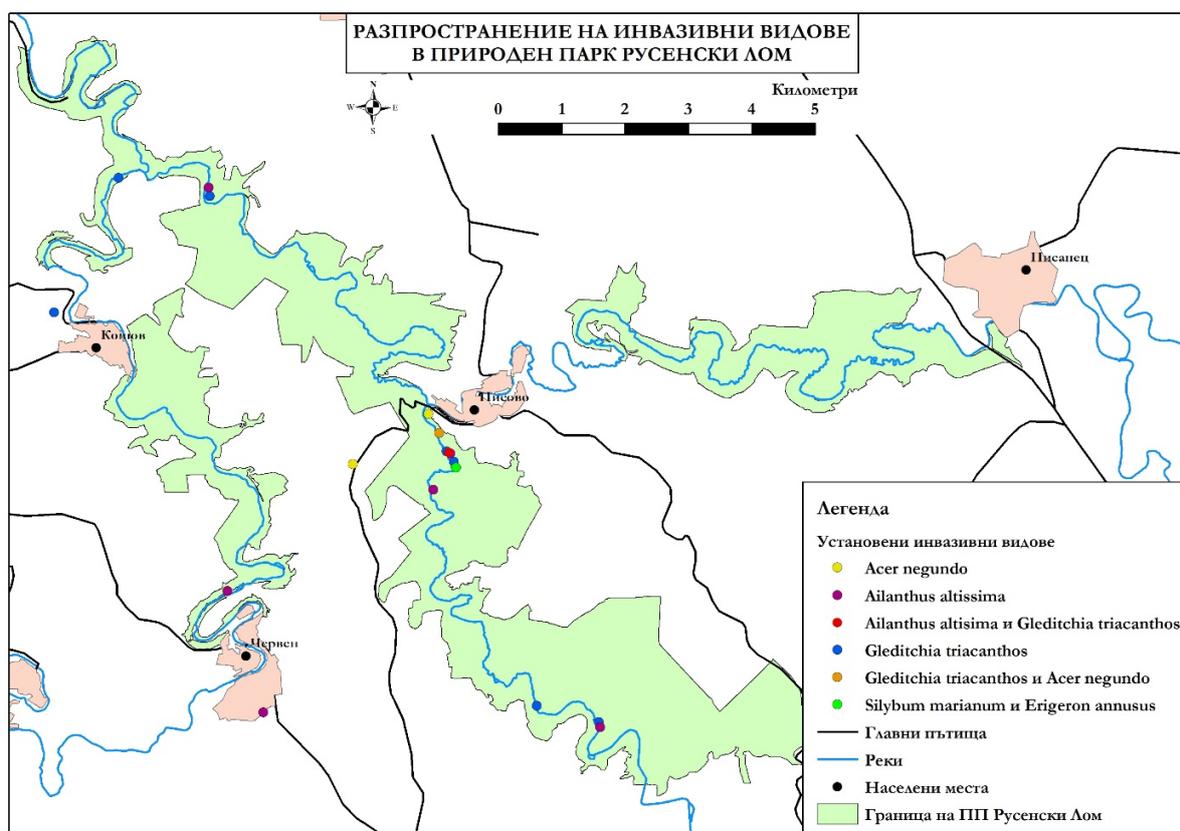
**Table 1. List of invasive tree and shrub species in Rusenski Lom Nature Park.**

№	Species	Origin	Use and input	Category
1.	<i>Acer negundo</i> L.	North America	forest crops; decorative	the worst invasive
2.	<i>Ailanthus altissima</i> (Mill.) Swingle	China	decorative	the worst invasive
3.	<i>Amorpha fruticosa</i> L.	North America	to strengthen slopes; decorative; honey	the worst invasive
4.	<i>Gleditsia triacanthos</i> L.	North America	forest crops; decorative; honey	weakly invasive
5.	<i>Lycium barbarum</i> L.	China	decorative	weakly invasive
6.	<i>Parthenocissus quinquefolia</i> (L.) Planch.	North America	decorative	weakly invasive
7.	<i>Robinia pseudoacacia</i> L.	North America	forest crops; honey	the worst invasive

**Table 2. List of invasive herbaceous species in the Rusenski Lom Nature Park.**

№	Species	Origin	Use and input	Category
1.	<i>Bidens frondosus</i> L.	North America	Unintentional introduced	the worst invasive
2.	<i>Erigeron annuus</i> (L.) Desf.	North America	Unintentional introduced	weakly invasive
3.	<i>Erigeron canadensis</i> L.	North America	Unintentional introduced	weakly invasive

4.	<i>Paspalum distichum</i> L.	Tropical Africa and America	Unintentional introduced	weakly invasive weakly
5.	<i>Phytolacca americana</i> L.	North America	Deliberately introduced, technically	invasive weakly
6.	<i>Symphytotrichum novibelgii</i> (L.) G.L. Nesom	North America	Deliberately introduced, decorative	the worst invasive



## 2. Characteristics of the established invasive species in the Rusenski Lom Nature Park - distinguishing features, biology, ecology, distribution and endangered habitats.

- *Acer negundo* L. – (Board 1)

*Distinctive features:* Deciduous tree, 10–15 m high, with light gray bark. Young twigs green, naked and smooth, old light gray. Leaves 15–30 cm long, opposite, unpaired, composed of 3–5 (7) leaves. Leaves ovate-lanceolate to elliptical, with lobes entire to sparsely irregularly serrated, light green above, grayish-green below. Inflorescences clustered. Colors single-sexed, dioecious (only male or female only), yellow-green. Fruits dried double winged nuts, at an angle of 30-70 °.

*Biology and Ecology:* The arsenic maple blooms in March-April, before flowering, pollinated entomophilically (by insects) and anemophilically (by wind). Fruits from July to late autumn, with the fruit remaining even in winter on the tree, which allows them to move in the spring. The species reproduces itself by spreading the seeds either anemorrhagically (through the wind, which is aided by their wings) or zohornally (through their transfer from different birds or mammals). In addition, the seeds retain their vitality for a long period. An additional way of taking over new territories is vegetative propagation, by forming numerous root and stem shoots, especially after the stem is cut off.

The maple sycamore develops successfully both in sunny and shady places. It is not demanding on the soil, but prefers moist habitats. Resistant to watering and less to drought. It outgrows native shrubs and tree species in its growth, which is why it gradually displaces them, making them difficult to reproduce. In its natural habitat is a fast growing tree that inhabits riparian habitats and floodplains.

*Distribution and endangered habitats in Rusenski Lom Nature Park:* The ash-tree maple is most commonly found along the asphalt roads connecting the villages in the Rusenski Lom Nature Park. It was established in the section between the village of Svalenik and the village of Nisovo (as the most dense population forms at the descent of the road before the village of Nisovo), in the section between the village of Ivanovo and Ivanovo rock churches and between the village of Cherven and the Cherven fortress. Although rarer, it also enters natural habitats in the Rusenski Lom valley, where it is established between the village of Nisovo and Malak Nisovski Monastery, near the Park Visitor Center, and in the area between Ivanovo and

places. Mix it up. The species is found both in the periphery between oak forests and riparian meadows (where soil moisture is favorable) and in the composition of the riparian forests of natural habitat 91E0 \* Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion*, *Alnionincanae*, *Salnionincanae*, *Salnionincanaealbae*). In the Rusenski Lom Nature Park, the first tree floor of the 91E0 Habitat Forest is formed mainly by *Salix alba*, the participation of which is from 4 to 6 tenths. The species *Salix triandra*, *Ulmus laevis* and *Ulmus minor* occur individually in the composition of the tree or with up to 10% participation. The latter are gradually displaced by the Yasenolistovo maple, which in some places reaches 25% in the first and second tree floors, which violates the natural character of this habitat. Another disadvantage of this invasive species, though to a lesser extent, is the decrease in the area of riparian meadows of natural habitat 6510 Lowland hay meadows.

The main vectors for spreading the species are the road network in the Rusenski Lom Nature Park, where the invasion most often affects the easement of the road. Also, the species quickly captures the clearings. In the natural habitats the displacement of the ash-tree maple is carried out by the wind, as well as to some extent by the waters of the river Rusenski Lom.

- ***Ailanthus altissima* (Mill.) Swingle** – (Board 2.)

*Distinctive features:* Deciduous tree, 5–30 m high, up to 80 cm in diameter, with a gray smooth bark and a loose crown. Leaves large, 30–100 cm long, consecutive, non-stemmed, composed of 11–25 (41) leaves. Leaves ovate-lanceolate, 5–9 cm long and 2.5–4.0 cm wide, slightly concave at the base, slightly wavy to the edges, slightly irregularly toothed, with an unpleasant odor when torn. Colors 7–8 mm in diameter, yellow-green, unisexual (male or female only) collected at the tip of the branches in a loose, 10–20 cm long petiolate inflorescences. The fruits are dried winged nuts, 3–5 cm long. The wings are irregularly rhombic, flat, twisted, with one seed in the middle.

*Biology and Ecology:* Islandant blooms in June, after spraying, and is pollinated by insects. Fruits profusely from September to November. The seeds retain their germination for a long time, with some of them wintering on the tree and spreading in the spring. The species reproduces by itself, with seed dispersal being mainly anemhoric (through the wind, which is aided by their wings) or by birds and vegetatively through root shoots, which can be

underground up to 10-15 meters away from the main stem. Seeds can penetrate even the smallest cracks in the rocks, as well as the foundations and walls of buildings where they quickly sprout.

Aylante prefers deep soils, especially those along the alluvial river terraces, but grows even in less favorable soil conditions - on rocky and stony habitats. It is light-loving, but it also withstands shading, a fast-growing species, withstands both very hot and cold climates. Resistant to pests thanks to its leaf glands, which emit a pungent and repellent odor. Its stems and roots give it a specific secret that adversely affects the growth of nearby species. It is difficult to remove Aylant from the place where it is located. It displaces natural vegetation due to its extremely rapid growth and the formation of dense self-contained groups.

*Distribution and endangered habitats in RusenskiLom Nature Park:* The Aylante is most often found singly or in strips along the asphalt roads connecting the villages in RusenskiLom or on the outskirts of the settlements. It is located in the section between the villages of Svalenik and Nisovo, the most significant being the population on the descent of the road before the village of Nisovo, and in the western end of the village of Nisovo above the river bed of BeliLom river. Solid separate groups were registered south of the village of Cherven (along the dirt road for the antennas of the telecommunication operators), near the Cherven fortress, at the exit of the village of Nisovo towards the village of Shtraklevo and along the Mali Lom river (at the beginning of the route to GolyamNisovski monastery and in the section between the village of Svalenik and the pumping station). Single trees are also found in the section between the village of Ivanovo and Ivanovo rock churches and between the village of Cherven and the Cherven fortress.

Ailant is often found as a single tree in the riparian gallery forests as part of the natural habitat 91E0 \* Alluvial forests with *Alnusglutinosa* and *Fraxinus excelsior* (*Alno-Padion*, *Alnionincanae*, *Salicionalbae*). Increasing its participation in the composition of these forests leads to the gradual displacement of typical tree species and changes in the natural appearance of this habitat.

Another habitat directly affected by the Ailant is 8210 Hazmophytic vegetation along limestone rocky slopes. The dense overgrowths found in the valley of the Mali Lom River are on rocky terrains, with the species settling in the crevices along the rocky outcrops, except at the base of the rocks. With its aggressive rhizomes, the ailant causes the rock mass to be destroyed,

and with its crown it overshadows the typical rock plants, most of which are usually heliophytes (light-loving), thus changing the composition and natural appearance of the habitat.

The extent of *Alysicarpus* also affects the habitat to some extent 6110 \* Open calcifuge or basiphilous grasslands of *Alysicarpus albi*, which occupies more or less flattened rocky areas near the edge of the rock rim. On the one hand, locating the species on open rocky slopes results in shading and thus altering the specific species composition, and on the other hand, there is a potential threat to some conservation plant species within the range of this habitat, such as Siberian veal (*Polygala sibirica*), Dieckian lobelia (*Verbascum dieckianum*), and Four-pointed jaundice (*Genista tetragona*).

The main asexual dispersal vectors are the road network in Rusenski Lom Nature Park, where the invasion most often affects the easement of the road. In natural habitats, *Alysicarpus* displacement is carried out by wind, and to a certain extent by the waters of the river Rusenski Lom.

- ***Amorpha fruticosa* L.** – (Board 3)

*Distinctive features:* Deciduous shrub, 1–3.5 m high, with a smooth, gray to brown bark, strongly branched, with straight branches, and forming many dense shoots. Leaves 10–25 cm long, consecutive, unpaired, composed of 9–25 leaves. Leaves ovate to elliptic, 2–4 cm long and 1–2 cm wide, with small (3–5 mm) petioles at the base. The leaf axis is greenish-brown to gray (unlike the white acacia, where the axis is green). Inflorescences 7–15 cm long, dense, erect, corymbose, located at apex of branches. Colors highly aromatic, up to 6 mm long, violet-blue, with orange stamens. The fruit is an elongated bean, 6–10 mm long, brown, glabrous or slightly fibrous, with a dotted reddish gland containing 1–2 smooth brownish seeds.

*Biology and Ecology:* Asexual flowers bloom from mid-May to mid-August and are pollinated by insects, mainly bees. It is an important honey plant almost as much as white acacia. Fruit species from August to October. Usually, most of the fruits remain on the bushes in winter and move in the following year. *Amorpha* forms a powerful root system, which is why it successfully propagates vegetatively through root shoots. It also propagates seed, producing numerous seeds with high germination. The seeds are light and easily spread by water currents or through animals.

In its natural range, in North America, the amorphous grows in light riparian forests and in the floodplain, indicating that it is a light-loving species. In Bulgaria it is attached to moist riparian floodplain habitats, often as an undergrowth in poplar crops along rivers, but it also occurs along roads where it withstands prolonged droughts.

Prefers deep and fertile soils, but also tolerates saline soils. Due to its coexistence with nitrogen-fixing bacteria, it has the ability to absorb atmospheric nitrogen, which is why it can grow on many nitrogen-poor soils. Amorphous is resistant to winds. It tolerates low temperatures and, when frosted, quickly recovers from stem and root shoots. It forms extensive and dense stand-alone groups, especially along the Danube riverbank, where it displaces native species and changes the structure of riparian vegetation.

*Distribution and endangered habitats in Rusenski Lom Nature Park:* Amorphous is one of the most widespread invasive alien species in the Rusenski Lom Nature Park. It is most commonly found along the asphalt roads connecting the villages in the Rusenski Lom Nature Park. It is established in the section between the village of Svalenik and the village of Nisovo, where in some places it forms dense impassable stripes along the road and even overhangs it. Similar dense roadside galleries were formed in the section from the village of Cherven to the fork for Nisovo and Svalenik and in the section for the village of Nisovo-Batakliya-village of Svalenik. The amorphous species has permanently settled in some of the natural habitats in the Rusenski Lom valley, with the most affected are the riparian galleries of the habitat 91E0 \* Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion*, *Alnion incanae*), *Salicion albae*. Single or in small groups, the species is found throughout the valley of the Rusenski Lom River. As a light-loving species, the amorphous is very successfully settled along the bed of the Lomov, in places where there is no riparian forest or it has a very loose structure. Rarely, the species can capture riparian grass coenoses of habitat 6510 Lowland hay meadows, leading to a decrease in its area.

The light fruits of the amorphous are easily spread from the waters of the river Rusenski Lom, which is the main vector of the species distribution on the territory of the Rusenski Lom Nature Park. To a lesser extent the species is carried away by wind and animals.

- ***Gleditsia triacanthos* L.**–(Board 4)

*Distinctive features:* Deciduous tree, 15-25 m high, with a branched crown. Stem up to 1 m in diameter, bark brown to almost black, furrowed, covered with long, branched spines. Leaves 15–30 cm long, consecutive, sometimes arranged in bundles, complex, paired (simple or rarely double-pointed), composed of 10–14 pairs of leaves. Leaves 10–25 mm long, 7–12 mm wide, ovoid, light green, glossy. sat down. Bisexual colors are also rare. The male flowers are clustered in succulent, 5-9 cm long, clustered inflorescences, while the females are several or single in color. Fruits 15-40 cm long pods, twisted, brown, leathery, fall in winter without bursting. Seeds 0.5-1.5 cm long, dark brown, glabrous, smooth, with a hard sheath.

*Biology and Ecology:* The viewer blooms in May and July and is pollinated by insects, fruiting in August and September. A fast-growing species, which after the third year bears fruit regularly and in abundance. Fruits are the preferred food of various birds and mammals and thus, zoochorrally, the species spreads over great distances. Some of the fruits (pods) fall in the fall, while others remain on the tree in the winter. The viewer is propagated by seeds that have high germination, which persists for a long time, thanks to its hard shell. Their germination increases after passing through the digestive system of animals.

The viewer forms many shoots, especially after cutting. It prefers deep and rich soils in river valleys, but withstands both dry drought and saline soils. Windproof, it strengthens the soil and prevents erosion. It is most commonly found near the places where it is cultivated, and in larger distances it is usually represented by single trees.

*Distribution and endangered habitats in Rusenski Lom Nature Park:* The viewer is found as a single tree, most often along the roads connecting the villages in the Natural Park Ruse Lom. It was observed in the sections of Nisovo-Svalenik, Nisovo-Batakliya - Svalenik, Ivanovo-Koshov and Ivanovo-Ivanovo rock churches. Like single trees, the species is found in riparian meadows and in riparian forests in many places in the valley of Ruse Lom. It was established along the Mali Lom River in the section from the village of Svalenik to the Pumping Station and from the village of Nisovo to Golyam Nisovski Monastery, along the Beli Lom River in the Obretenka area. The invasion of this species has been low so far. Habitats 6510 Lowland hay meadows and

91E0 \* Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (Alno-Padion, Alnion incanae, Salicion albae) are minimally affected.

Birds and mammals are the main vectors for propagation of the gazebo, which feed on its fruits and carry them over long distances. Another vector is the man with the cultures of the past, created in the past.

- ***Lycium barbarum* L.** – (Board 5)

*Distinctive features:* Deciduous, highly branched shrub up to 2.5 m high. Branches thin, arcuately curved, prickly. Leaves 2–10 cm long, narrowly elliptic, entire, more or less fleshy, at the base wedge-shaped, glabrous, on the petioles, clustered in groups of several truncate twigs. Colors 5–15 (20) mm long, thickened to the apex, in groups of 2–6 truncated twigs or 1–2 elongated twigs. Calyx 4–5 mm long, bell-shaped, double-lobed. Corolla funnel-shaped, up to 15 mm long, purple, turning brown towards the end of flowering. Fruit 8–18 mm long, elliptical to ovoid. Seeds 2.5–3 mm long, rounded to kidney-shaped, gray-brown or yellowish.

*Biology and Ecology:* Propagated by seed and vegetatively. It blooms in June-October. It is pollinated by insects, mainly bees. Fruits July-October. The spread of the seeds is zoological - the fruits serve as food for some species of birds and mammals. Vegetative propagation is by root shoots.

Mergiana is not demanding on soil conditions, it is dry, cold-resistant, it can withstand shade, but more abundantly fruiting in sunny places. It forms dense, often occupying tens of square meters, spots, thus competing with native species for space, nutrients, water and light. It changes the composition and structure of plant communities. Cutting the stems stimulates the formation of new shoots and leads to a greater thickening of the shrubs. Widely grown as an ornamental shrub and for hedges, as well as soil and landslides, it is used for healing purposes.

*Distribution and endangered habitats in Rusenski Lom Nature Park:* It grows in grassy areas, along roads, rivers and settlements. On the territory of the Rusenski Lom PP Merdjana is found mainly in deserted places near the settlements, since it was probably cultivated in the gardens and subsequently went wild. Overall, his invasion is weak. Minimally affects riparian habitats 6510 Lowland hay meadows and 91E0 \* Alluvial forests with *Alnus glutinosa* and

*Fraxinusexcelsior* (Alno-Padion, Alnionincanae, Salicionalbae). Because it prefers sunny places, it is housed in riparian forest galleries with disturbed structure or low cover.

The main vector of distribution is the man who cultivates mardjan in rural gardens, and the secondary vector of displacement is the animals feeding on its fruits and carrying it over greater distances.

- ***Parthenocissus quinquefolia* (L.) Planch.** –(Board 6)

*Distinctive Features:* A bushy deciduous shrub attached to the whiskers at the top provided with a mounting disc that provides a stable grip for buildings and rocks. Stems up to 30 m long. Leaves consecutive, palmate, with 3–7 ovate-elliptic lobes. Portions 5–10 cm long, numerous toothed edges, green, reddish towards the end of the growing season. The bracts arranged at each junction opposite the leaves, with 5–12 branches, each at the apex with an attachment disk. Inflorescences thyroid, with several lateral branches, arranged opposite the leaves. Colors 5-lobed, small, regular, greenish, petals about 3 mm long, curved back. Fruit fleshy, bluish-black, about 6–9 mm in diameter, when ripe with a surface coating. Seeds 2-3 in each fruit, globose, with a thick keel.

A similar species is the *Parthenocissus inserta*, which differs mainly from the shape of the mustache and the way of attachment - the mustache in the *Parthenocissus inserta* has fewer branches and does not end with a attachment disk.

*Biology and Ecology:* Propagated seed and vegetatively. It blooms in June-July. It is pollinated by insects, mainly bees and wasps. Fruits profusely in August-October. It is distributed mainly by the birds that feed on the fruits, and they usually remain on the plants in winter. The seeds germinate in the first or second year after they are in the soil. The vegetative propagation is by rooting at the sites of the internodes of the stems when they are in contact with the soil or through parts of the cut stems left after mechanical damage.

Fast growing species. Prefers open spaces, but grows well in shady places. It forms populations of varying sizes - from single, scattered plants, to groups of several dozen to several hundred individuals. Enters competition for light and space with plants; damages the walls of buildings that climb.

It is used as an ornamental plant and to combat erosion and strengthen soil on slopes. Fruits are poisonous to humans because of their oxalic acid content, but because they have a bad taste, poisoning with them is unlikely; contact with the fruit can cause skin irritation and dermatitis. Distribution and endangered habitats in the RusenskiLom Nature Park: Occurs in forest suburbs, abandoned and disturbed habitats, rocky places, along fences and walls of buildings, along roads, railway lines, arable land.

The RusenskiLom Nature Park is mainly found near the settlements and mainly on rocky terrains. It affects the habitat 8210 Chasmophytic vegetation on limestone rocky slopes, preferring sunny rocky outcrops, but can also be found in shady areas where it competes with ivy. Thick overgrown vines endangering and gradually displacing the local haemophytic flora. The invasion of this species in the RusenskiLom valley is still weak, but timely monitoring should be carried out in order to protect the vulnerable rocky terrain.

- ***Robinia pseudoacacia* L.** – (Board 7)

*Distinctive features:* Deciduous tree, 15-20 m high, with a strongly branched crown. The bark is grayish brown, rough, longitudinally cracked. Leaves 10–30 cm long, consecutive, unpaired, composed of 3–10 pairs of leaves. Leaves ovate to elliptic, entire, short-fibered to almost glabrous. The young branches at the base of the leaves with 2 large, sharp thorns that later fall off. Inflorescences 15-20 cm long, clustered, drooping, located in the grooves of the leaves. Calyx 5-6 mm long, double-lobed, broad-billed, fibrous. Corolla 15–20 mm long, irregular (of 5 petals of different shapes - flag, boat and wings), white, naked. Fruits 5–10 cm long, oblong, laterally flattened, glabrous, dark brown, with 4–10 seeds, Seeds 4–5 mm long, kidney-shaped, dark brown to black, smooth.

*Biology and Ecology:* Propagated seed and vegetatively. It blooms in May-June. It is pollinated by insects, most often bees. Fruits profusely in September-October. The fruits are preserved on the tree until next spring, opened on it, and the seeds spread through the wind over long distances and retain their vitality for more than 10 years. Vegetative propagation is by stem and root shoots, which are formed in abundance, especially when cutting off the aerial part or after burning. This leads to the creation of dense, monodominant communities that completely suppress the development of natural vegetation.

Fast-growing species, light-loving, dry-resistant, one of the most demanding of soil and climatic conditions. Prefers deep, fertile and moist soil. It tolerates shallow, dry and poor soils, but shows poor growth. It survives many acidic soils better than other species. Feels good in windproof places. It occupies highly disturbed habitats. It tolerates well-polluted air. Does not tolerate cold at a young age. On limestone terrain it suffers from chlorosis. It enters into symbiotic relationships with nitrogen-fixing microorganisms, through which it absorbs atmospheric nitrogen and

at the same time it enriches the soil with nitrogen salts. The change in environmental conditions influences the floristic composition of the places occupied by white acacia.

A decorative and very good honey species, with considerable interest in beekeeping, it is used to strengthen landslides for erosion purposes, and wood is used in carpentry. Due to the valuable economic qualities of the species, it has been cultivated for a long time and too widely. Leaves, seeds and bark are toxic to humans and animals.

*Distribution and endangered habitats in the RusenskiLom Nature Park:* An extremely dangerous invasive species, occupying vast territories in the country, which has led to the suppression of the development and destruction of the natural flora and vegetation, as well as to the irreversible loss of its occupied habitats. White acacia is the most widespread invasive species in the RusenskiLom Nature Park. On its territory there are large areas occupied by white acacia crops created in the recent past, which represent the potential for restoration of the oak habitats of 91M0 Balkan-PannonianCera-Gorun forests and 91I0 \* Euro-Siberian steppe forests with *Quercus* spp.

White acacia is abundant and along the road network connecting the settlements in the RusenskiLom Nature Park and especially in the sections of Svalenik-Nisovo and Nisovo-Shtraklevo. On the outskirts and in the outskirts of settlements, white acacia also invades along with ailant and the gilic. Changing soil conditions and, in particular, increased nitrogen content, where white foliage grows or grows, makes it difficult to restore native vegetation.

- ***Bidens frondosus* L.** – (Board 8)

*Distinctive features:* An annual herbaceous plant. Stems erect, 20–100 cm high, four-ribbed to round, longitudinally ribbed, nearly glabrous, branched, the branches opposite. Leaves opposite, unbranched, on stems. Leaves 3–5 in number, oblong-lanceolate to ovoid-lanceolate,

apex pointed, edematous, dark green, sometimes purple, scattered short hairy to glabrous, at least the lower two of the petioles. Baskets 10–20 mm in diameter, erect, arranged individually at the tips of the twigs, the stem and in the grooves of the upper leaves, forming loose petiole inflorescences. Cover wraps in 2 rows, outer 5-8, green or purple, inner ovate oblong, dark brown to almost black. Colors tubular, about 5 mm long, yellowish brown; the pagan colors are usually undeveloped. Fruits type fruiting, 5–10 mm long (without ossicles), cuneiform, flattened, brown, with scattered hairs almost glabrous, apex with 2 tips, erect.

Similar species are *Bidens tripartitus*, an indigenous species with no distinct leaf petioles and smaller fruiting lobes (4.5–6.0 mm long), usually 3-pointed, and *B. vulgatus*, an alien species native to North America, with 10-20 outer carton wrappers.

*Biology and Ecology*: Propagated by seed. It blooms in June-October. It is pollinated by insects. Fruits July-November. Seeds are spread through water and waterfowl. It forms a large number of carpels - up to about 7,000 of a plant, which are easily attached to the fur of animals and clothes of humans with the help of their two bristles.

In most localities in Bulgaria it forms numerous populations with good density. It withstands some degree of drought, which is why it has more ecological plasticity than the native *Bidenstripartitus*.

Sometimes found together with *Bidenstripartitus* and *B. vulgatus*, forming mixed communities. It competes for nutrients and space with native species, especially *B. tripartitus* and *B. cernuus*, from which it grows much faster and reaches twice the size. In suitable conditions, it occupies fast vegetation-free sites, e.g. flood terraces after the water recedes, burning places, forming dense, numerous groups and thus hindering the localization of native herbaceous species.

Distribution and endangered habitats in the RusenskiLom Nature Park: It grows in wet places along canals, rivers, wadi, wetlands, dams, railways and roads, desolate territories.

As a typical hygrophyte, the deciduous beetle is found everywhere in riparian habitats in the valley of the river RusenskiLom. Most often it is an element of the ground cover in the gallery forests of natural habitats 91E0 \* Alluvial forests with *Alnusglutinosa* and *Fraxinus excelsior* (*Alno-Padion*, *Alnionincanae*, *Salicionalbae*), but generally prefer lighted river sections or riparian forests with more -Low folding.

Occasionally, 6510 Lowland hay meadows may enter some of the wetter areas of the habitat. It grows with the native species *Bidenstripartitus*. At the moment, no dense outcrops, which are characteristic of the Danube coast, have been observed.

The main distribution vector of the leafy beetle is the river course of the Rusenski Lom river, which is easily spread by light seeds. Due to the strength of its fruits, it is attached and displaced with the help of animals and humans, which are a secondary vector of distribution of the species.

- ***Erigeron annuus* (L.) Desf.** –(Board 9)

*Distinctive features:* An annual, rarely two- to perennial herbaceous rhizome. Stems erect, branched at the top, 35–100 (–150) cm high, rigid at the bottom, and almost bare at the top. Basal leaves in rosette, ovoid or elliptical, large toothed, scattered fibrous, dry during flowering; stem leaves elliptic, serrated, 6–10 cm long. Baskets of handles arranged in loose thyroid or petiole inflorescences. Wrap leaves in 2–3 rows, uniform, overlapping, erect, linear-lanceolate, 3–5 mm long, green or brownish, long dorsal along the dorsal vein. Colors of tongues and tubes; lingual colors 4–6 mm long, white or pale blue; tubular colors 2–2.5 mm long, yellow. Fruits 1.25 mm long, elliptical-like, flattened, smooth, short-fibrous. The kite is 1.5–2 mm long, composed of 1–2 rows of small flakes and hairs.

*Biology and Ecology:* Propagated seed and vegetatively. It blooms May-September. It is pollinated by insects. Fruits in July-October. Vegetative propagation is through rhizome shoots. Optional apomictic plant (asexual reproduction). There is a reproductive system that allows it to quickly colonize new territories as a result of apomictic seed formation, and on the other hand, the continued possibility of cross-pollination by insects and sexually generated seed is a prerequisite for genetic variability and adaptation. It forms an enormous number of seeds - about 10,000-12,000 from one individual who do not need a dormant period and can therefore produce more than one generation per year. Part of the seeds sprout in the fall and give overwintering leaf rosettes, and flower stalks are formed next year. The seeds retain their vitality for a long time - over 20 years.

It grows on diverse soils, but grows best on fertile, moderately moist alluvial, loose soils. Prefers sunny places, but withstands slight shading. A pioneer species that rapidly colonizes disturbed habitats and can reach significant densities - over 50-60 individuals / m<sup>2</sup>. With the

placement of perennial, tufted cereals and the thickening of the vegetation cover, the numbers and densities of American juvenile individuals gradually decrease.

It forms populations of varying numbers - from tens of scattered individuals to tens of thousands of plants, occupying several acres and forming monodominant groupings (in abandoned arable land). Compete with local pioneer species for nutrients, light and space. With more extensive development in pastures and meadows, their value is reduced, as animals are avoided. Used as an ornamental plant, in the past more often, and is now avoided because it quickly weeds the gardens.

*Distribution and endangered habitats in the Rusenski Lom Nature Park:* In Bulgaria, it occurs from thinned forests, meadows, pastures, abandoned arable land, near settlements, roads and railway lines, embankments, dykes, riverside terraces.

In the Rusenski Lom Nature Park the species is found in the moderately moist riparian grassland communities of the habitat 6510 Lowland hay meadows. The usual species composition of this habitat includes the species *Festuca pratensis*, *Alopecurus pratensis* and *Arrhenatherum elatius*, but in many places their participation is significantly reduced, to about 30%, while the American malady sometimes reaches 50%. This deterioration of the typical habitat character can only be overcome by restoring the meadow regimes of these meadows, which will reduce the participation of annual species. Although less abundant and dense, the American species is also found in some dry grassland habitats 6210 Semi-natural dry grass and shrub communities on limestone (*Festuco Brometalia*) (\* important orchid habitats) and 6240 \* sub-steppe grasslands.

The main vectors for the distribution of the American golden eagle are the river flow of the river Ruse Lom and the wind, which easily carry light seeds. Secondary the vector of distribution of the species are animals and humans. Human propagation can be accomplished both by means of transport and by the contamination / mixing of the seeds of cultivated plants with the small and inconspicuous seeds of the owl.

- ***Erigeron canadensis* L.**

*Distinctive features:* One- to two-year-old herbaceous rhizome. Stems 30–100 cm high, branched at the top, densely covered, sparsely fibrous. Leaves consecutive, back narrowly lanceolate; lower early drooping lobes, adjoining stem, 1–10 cm long; upper leaves smaller,

sessile, almost glabrous. Baskets bell-shaped, numerous, individually on long handles, forming an elongated, loose, meticulous inflorescence. Wrap leaflets in 2–3 rows, almost identical, overlapping, erect, linear-lanceolate, 1.5–3 (4) mm long, naked or almost naked when ripe. Lingual colors numerous, white rarely pale pink; tubular, pale yellow. Carpels obovate, flattened, smooth, 1-1.2 mm long, scattered fibrous. The 20–22 kite is a simple, white-brown, fine-grained hair.

Similar species are *Erigeron bonariensis* and *E. sumatrensis*, which are characterized by fibrous enveloping leaflets of baskets and very short, inconspicuous tongue-in-cheek colors.

**Biology and Ecology:** Propagated seed and vegetatively. It blooms in May-November. Mostly self-pollinated species, although cross-pollination by insects is also realized. Fruits August-November. Vegetative propagation is through rhizome shoots.

It forms an enormous number of fruiting plants - 60-70 from one basket and up to 200 thousand from one well-developed plant. Thanks to the kite, the carpels are carried away by the wind. Most of them germinate in the fall, forming overwintering leaf rosettes, and a small part - in the spring. Seeds remain viable for long periods, sometimes over 10 years.

A pioneer species, one of the earliest habitats of disturbed or newly created habitats lacking vegetation cover. It often forms mixed sites with *Erigeron bonariensis* or *E. sumatrensis*, or with both species together. Under appropriate conditions, it forms numerous populations of tens of thousands of plants. It competes with native species for nutrients, light and space. One of the most common weeds in trench crops, vineyards and gardens, where mass development leads to a significant decrease in crop yields. In the pastures, their productivity decreases.

*Distribution and endangered habitats in Rusenski Lom Nature Park:* The Canadian species is predominantly found in man-made or severely disturbed habitats - deserted, abandoned and untreated places along roads, railways, settlements, weeds in trench crops, vineyards, gardens, crops forage crops, intensively used pastures, sand dunes, riverside floodplains and more.

In the Ruse Lom Nature Park, canadensis is mainly found in the outskirts of settlements and in abandoned arable lands. In terms of native vegetation, it affects, albeit to a lesser extent, the American goldenrod, the riparian meadows of the habitat 6510 Lowland Hay-meadows. As a more affluent and more drought tolerant species, the species can also enter the dry herbaceous

phytocoenoses of the 610 habitous dry herbaceous and shrub communities on limestone (FestucoBrometalia) (\* important orchid habitats) and 6240 sub-canopy communities.

The main vector for the spread of the Canadian jellyfish is the wind. Man and animals can also help seed displacement.

- ***Paspalum distichum* L.**

*Distinctive Features:* A perennial herb with creeping rhizomes and rooting on the nodules. Stems 15–60 cm high, smooth, glabrous. Leaves consecutive, 4–17 cm long, 2–6 mm wide, linear-lanceolate, solid, glabrous or at the base of the midrib with sparse hairs. Inflorescences usually with 2 (rarely 3–4), 2–7 cm long, classy, narrow and flat twigs, similar to those of splinters. The lobes ovate, slightly pointed, 2.5–4.0 mm long, axially flat, outwardly convex, usually single, with lobes, overlapping, light green. Lower chaff usually like a small flake or almost missing; upper chaotic grass with 3 veins equal to the stalk, glabrous or on either side of the midrib with sparse, short, adjacent hairs; outer weed tentacle, naked, elliptical, equal to the calyx. Seeds elliptical, about 3 mm long, glabrous.

*Biology and Ecology:* Propagated by seeds and mostly vegetatively. Blooms and fruits throughout the year. It is pollinated by the wind. There is low seed production, the seeds are of poor vitality, which makes seed reproduction more limited. Vegetative propagation is by means of stolons and shoots and their parts. Stools stay green all year long, especially if they grow in water.

It requires moisture but also withstands drought. It grows on swampy, brackish, saline soils with good moisture in summer, near hot springs, polluted water near settlements, like weeds in rice fields. When the frosts arrive, the leaves darken and die, but the stolons survive. Fast growing species. Under appropriate conditions, it forms dense cover and prevents the localization and spread of native plant species.

*Distribution and endangered habitats in the RusenskiLom Nature Park:* In the territory of the RusenskiLom Nature Park, the water cod is found in natural and semi-natural hygro- and hydrophytic grass phytocenoses. One of the habitats affected is 3150 Natural eutrophic lakes with vegetation of the Magnopotamion or Hydrocharition type, which occupy the periphery and water mirror of the fish farms in the village of Svalenik. The second threatened habitat is 7220 Hardwater springs with tufted formations, which have a point distribution in the valley of the

Mali Lom River. Thick aquatic fouling leads to changes in the optimal species composition and displacement of native species, thus degrading the quality of these vulnerable aquatic habitats.

- ***Phytolacca americana* L.** – (Board 10)

*Distinctive features:* Perennial herbaceous plant with radish thick rhizomes. Stems 1–3 m high, cylindrical, fleshy, straight, sometimes stiff at the base, usually moist branches branched at the top, glabrous, green, often red. Leaves consecutive, 10–25 cm long, 3–6 cm wide, entire, ovoid-lanceolate, with strongly convex midrib, darker green than the upper surface and lighter green than the lower, turning red in early autumn. The flowers are 5-lobed, simple, small perianth, bisexual, with 3 bracts; perianth leaves ovate, dull, greenish-white, turning red at the fruit. Inflorescences 10–15 cm long, clustered, opposite to the leaves, drooping downwards. Fruit fleshy, round, initially green, when ripe dark red, composed of 10 segments, ring-shaped and interconnected. Seeds 2.5–3.0 mm in diameter, lenticular, shiny, black, glabrous.

Middle in external morphology with *Phytolacca esculenta*, which is distinguished by its broad-ovate leaves, erect inflorescences and fruit composed of 8 free segments.

*Biology and Ecology:* Propagated by seeds. Flowering and fruiting June–August, but can last until September–October. It is pollinated by insects. It spreads zoochorrally - through birds that use fruit for food. Each individual forms up to several hundred seeds that retain their vitality for up to ten years in the soil. From spring rhizomes of older individuals, in spring, 6–10 healthy stems grow distant from the parent plant.

It grows mainly on disturbed, abandoned, ruderal, polluted terrains, penetrates into natural habitats, outskirts of forests, roadside, in gardens. It develops equally well in sunny and shady places. Fruits, roots and mature plants are poisonous. Fruits used in large quantities are poisonous to humans, while birds are resistant to them. Used extensively in earlier times in medicine for scurvy, rheumatism, gout, etc., as well as dyeing wool and silk fabrics. Host of many plant viruses causing various diseases.

*Distribution and endangered habitats in the Rusenski Lom Nature Park:* The winemaker is most commonly found on the outskirts of the settlements, probably grown as a garden plant where it has gone wild. In riparian habitats in the valley of the river Rusenski Lom, it is most often an element of the ground cover in the gallery forests of natural habitats 91E0 \* Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (Alno-Padion, Alnionincanae, Salicionalbae),

but generally preferred illuminated river sections or lowland riverine forests. Sometimes the winemaker can also enter the habitat 6510 Lowland hay meadows, but in general its invasion is weak and usually occurs as a single plant or grows in small groups.

The main distribution vector is the birds that feed on the fleshy fruits of the winery. Man also contributes to his displacement, as he has decorative qualities and people cultivate him in their gardens. Mechanical removal before the ripening of the fleshy fruit is the surest method of combating this invasive species.

- ***Symphyotrichum novi-belgii* (L.) G.L. Nesom** – (Board 11)

*Distinctive features:* Perennial herbaceous plant. Rhizome long, creeping. Stem 30–120 cm high, erect, branched, often reddish, glabrous or on the ribs and branches of complex inflorescences fibrous. Leaves consecutive, elliptic, ovoid or linear-lanceolate, 4–10 times longer than wide, at the base with apex, more or less stem-covered, glabrous, sparsely serrated, marginally fibrous. Baskets numerous, clustered in pubescent inflorescences, glabrous or slightly fibrous. Wrap leaflets in 4 rows, almost identical, erect, linear-lanceolate, acute, up to 5-7 mm long, pointed to the sides or their tips facing back, grassy. Colors of tongues and tubes; tongues 15–30, blue or pink to white; tubular colors yellow. Carpels conical, with 5 ribs, transversely wrinkled, more or less fibrous. The kite is whitish, pale brown to yellowish, with numerous hairs at the base grown into a ring.

*Biology and Ecology:* Propagated by seeds and vegetatively. It blooms in August-October. It is pollinated by insects. Fruits September-November. A flowering stem can form about 4,500 fruiting plants in one wind-growing season with running water and attached to the fur of animals. Once in a new place, individuals reproduce mainly vegetatively through underground stolons. One stem can form up to 10-12 underground columns, which can reach up to 1 m in length. The density can reach 50-200 above-ground stems / m<sup>2</sup>.

They grow on moist, humus-rich soils, in sunny or poorly shaded areas; withstand prolonged flooding. With prolonged droughts and heat, their growth is inhibited. It forms dense independent groups with a large area and several thousand flower stalks. In this way, they compete with native species for nutrients, water and light, displacing them and altering the composition and structure of plant communities. Grown in gardens and parks as decorative, in places wild.

*Distribution and endangered habitats in the Rusenski Lom Nature Park:* They occur along rivers and canals (in grasslands and on the outskirts of alluvial forests), vats, gardens, abandoned arable land, railway lines and roads.

As a typical hygrophyte, the Belgian star is found everywhere in riparian habitats in the valley of the river Rusenski Lom. Most often it is an element of the ground cover in the gallery forests of natural habitats 91E0 \* Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion*, *Alnionincanae*, *Salicionalbae*), but generally prefer lighted river sections or riparian forests with more -Low folding. Occasionally, 6510 Lowland hay meadows may enter some of the wetter areas of the habitat. At the moment, no dense outcrops, which are characteristic of the Danube coast, have been observed.

**Table 3. Endangered habitats in the Rusenski Lom Nature Park as a result of invasion of invasive species.**

№	Species	endangered habitats
1.	<i>Acer negundo</i> L.	6510, 91E0*
2.	<i>Ailanthus altissima</i> (Mill.) Swingle	6110*, 8210, 91E0*
3.	<i>Amorpha fruticosa</i> L.	6510, 91E0*
4.	<i>Gleditsia triacanthos</i> L.	6510, 91E0*
5.	<i>Lycium barbarum</i> L.	6510, 91E0*
6.	<i>Parthenocissus quinquefolia</i> (L.) Planch.	8210
7.	<i>Robinia pseudoacacia</i> L.	91I0*, 91M0
8.	<i>Bidens frondosus</i> L.	6510, 91E0*
9.	<i>Erigeron annuus</i> (L.) Desf.	6210*, 6510
10.	<i>Erigeron canadensis</i> L.	6210*, 6240*. 6510
11.	<i>Paspalum distichum</i> L.	3150, 7220
12.	<i>Phytolacca americana</i> L.	6510, 91E0*
13.	<i>Symphytotrichum novi-belgii</i> (L.) G.L. Nesom	6510, 91E0*

The main propagation vector of the Belgian star is the river course of the river Rusenski Lom, which easily carries light seeds. Pomegranates, equipped with a kite, are successfully carried away by the wind. Once settled in a place, the species can be difficult to remove

because of the formation of numerous underground columns, with the help of which the Belgian star tightly covers large spaces.

#### 4. General measures for control and restriction of invasive tree and shrub species:

- The main way to combat this is to cut down with the subsequent rooting of the logs and roots and to make long-term monitoring mandatory.
- Mandatory long-term annual monitoring and, on this basis, agrotechnical and forestry activities (felling, grubbing up, braking by monthly cutting of shoots) to combat and limit the spread of invasive species on an annual basis.

The following principles should be observed when conducting forest management measures for invasive species (in the presence of established forest crops and windbreaks):

- It is necessary to gradually restore the diversity of native autochthonous shrubs, shrubs and grasses through the established acacia and cultivation monocultures. It is recommended that residues (branches, tops, etc.) should not be collected and burned when performing forestry activities, due to the specificity of acacia and the breeding grounds (when heated, the seed coat breaks and emergence is spontaneous in this way. a mechanism for surviving frequent fires in their natural propagation plows), thereby limiting seed reproduction.
- It is recommended that when harvesting be carried out, they should be designed to tolerate native species.
- It is advisable, when eradicating invasive tree species, that part of the affected area is not afforested but left to natural succession. This will contribute to increasing the structural and species diversity of the territory.
- Changes in plantations should not be drastic in order to allow time for adaptation of other organisms. This means low intensity of cutting (up to 20-25%) focused on small areas or groups. The oaks (where present) should be rooted longer to ensure their future involvement in the tree. When carrying out forestry activities, maintain about 8-10% of dead wood.
- Do not allow activities (including forestry) that increase anthropogenic fragmentation of the territory. When planning roads and infrastructure, it is necessary to preserve the integrity of the landscape as much as possible.

- A buffer zone of at least 15 meters wide should be formed around the permanent watercourses, in which logging and rooting of invasive species can be done annually, with mandatory long-term monitoring.
- Cultivated crops should be managed in order to achieve a smooth and continuous transformation and return of native species. This means conducting regular forestry activities that support and protect the emergent representatives of the native tree flora.

#### 4. Common measures for the control and restriction of invasive herbaceous species:

- The main way to combat annual species in riparian meadow communities is to restore the hay regime, which should be done annually. This will prevent the formation of new seeds and the gradual depletion of the seed stock that has been accumulated over the years.
- Mechanical removal of perennial species, such as the Belgian star, winemaker and cod, is a laborious approach and not very effective, but given the inability to use chemical warfare in protected areas, this method remains the only acceptable one.
- Carry out long-term annual monitoring of invasive grassland areas.

## II. ANALYSIS OF THE ROLE OF RIVER FLOWS FOR THE SPREAD OF FOREIGN AND INVASIVE SPECIES.

In the course of the field surveys, the sites of invasive species have been identified, large enough groups have been formed and can be considered as a source of intensive distribution of reproductive materials on the territory of the Rusenski Lom Nature Park. This applies to the following types:

- *Acer negundo*
- *Ailanthus altissima*
- *Gleditsia triacanthos*
- *Erigeron annuus*
- *Silybum marianum*.

Geographic coordinates were measured for each of these potentially hazardous locations to include subsequent modeling of their threats.

In order to assess the role of the river network in the spread of invasive species, a modeling system was used, which was implemented in an ESRI ArcGIS environment using the ArcHydro extension.

The necessary preparation for modeling in the GIS environment has been completed by creating appropriate reference layers for this purpose. As a first step, a hydraulically correct raster layer was constructed using a numerical model of a 4x4 meter cell relief. This layer determines the direction of runoff and the degree of accumulation of water for each cell in the raster. These indicators were used to generate a precise diagram of the river network providing water runoff from the park area. A layer was also created, including all the separate catchments in the park and park area.

The layers thus prepared were used to identify the areas threatened with invasion by invasive species. This was achieved by establishing for each of the five species the spatial relationships between the respective localities and the catchments already generated. Based on the presumption that the river flow supports the dissemination of generative material from the species cited, the principle of determining the area of influence of a site is reduced to widening by including all catchments located downstream, starting from the one in which the field falls. .

At the next stage, after the identification of the areas with potential invasive species invasion, the potential spatial impact on the Natura 2000 habitats was assessed. Within the boundaries of the Rusenski Lom Nature Park, 12 habitat types from Annex 1 to the Biodiversity Act were identified. Each of these habitats is reflected in a spatial layer derived from the combination of the forestry map, the repossession map and the cadastral map. Through the spatial intersection of the layers presenting the threat of the spread of individual species and the layers representing the spread of each individual habitat, the area of the habitat is exposed, which is at immediate risk of invasion of invasive species. The results of the identified threats are presented in Table 4.

The following annexes are attached to the analysis of the role of river currents in the spread of alien and invasive species:

1. Cards presenting threats from the spread of invasive species for habitats in the Annex to the Biodiversity Act.
2. Geo-database containing the following spatial layers:

- Identified habitats of the invasive species analyzed (*alien\_species* and *alien\_species\_3D*)
- habitats from the Annex to the Biodiversity Act (*PARK\_N2000\_habitats*)
- Areas where the spread of the invasive species analyzed is potential (*Catchment\_name\_on\_species*)
- Habitats potentially threatened by invasive species (*PARK\_N2000\_clip\_name\_on\_species*)
- Hydrologically correct numerical relief model (*dem\_filled*)
- River network (*DrainageLine*)
- Border of the Rusenski Lom Nature Park (*RL\_NSZP*)

**Table 4. The results of the identified threats.**

Habitat	Total area in RusenskiLom Nature Park	Area threatened by:									
		Acer negundo		Silybummarianum & Erigeron canadensis		Gleditsiatriacanthos		Ailanthus altissima		*Total endangered area	
		ха	%	ха	%	ха	%	ха	%	ха	%
3260	12,6							12,6	99,8	12,6	99,8
40A0	4,8	0,1	1,9	0,1	1,9	4,8	100,0	4,8	100,0	4,8	100,0
6110	98,5	52,5	53,3	52,5	53,3	53,8	54,6	85,1	86,4	85,1	86,4
6210	220,4	80,1	36,3	80,1	36,3	136,2	61,8	156,5	71,0	156,5	71,0
6250	0,8	0,8	100,0	0,8	100,0	0,8	100,0	0,8	100,0	0,8	100,0
6510	296,5	94,0	31,7	94,0	31,7	176,2	59,4	228,9	77,2	228,9	77,2
8210	65,7	14,9	22,6	14,9	22,6	38,0	57,9	46,4	70,7	46,4	70,7
91F0	38,0	1,9	5,0			13,3	35,1	13,8	36,3	13,8	36,3
91G0	3,3										
91H0	18,0							18,0	100,0	18,0	100,0
91M0	689,8	2,6	0,4			237,4	34,4	237,4	34,4	237,4	34,4
91Z0	203,8	10,6	5,2			40,2	19,7	40,8	20,0	40,8	20,0

**Note: threat overlaps from different invasive species have been reported.**

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**BOARD 1.** *Acer negundo*. **A.** Leaves and twigs. **B.** Fruits.



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**BOARD 2.** *Ailanthus altissima*. **A.** Leaves and twigs. **B.** Ailant shoots on the outskirts of the village of Cherven. **C.** Ailant overgrowth along the rocky habitats along the Mali Lom River near the village of Nisovo.



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**BOARD 3.** *Amorpha fruticosa*. Leaves and inflorescences.



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**BOARD 4.** *Gleditsia triacanthos* along the riparian meadows the Mali Lom Valley. **A.** Leaves and inflorescences. **B.** Bodley. **C.** Stems with spines.



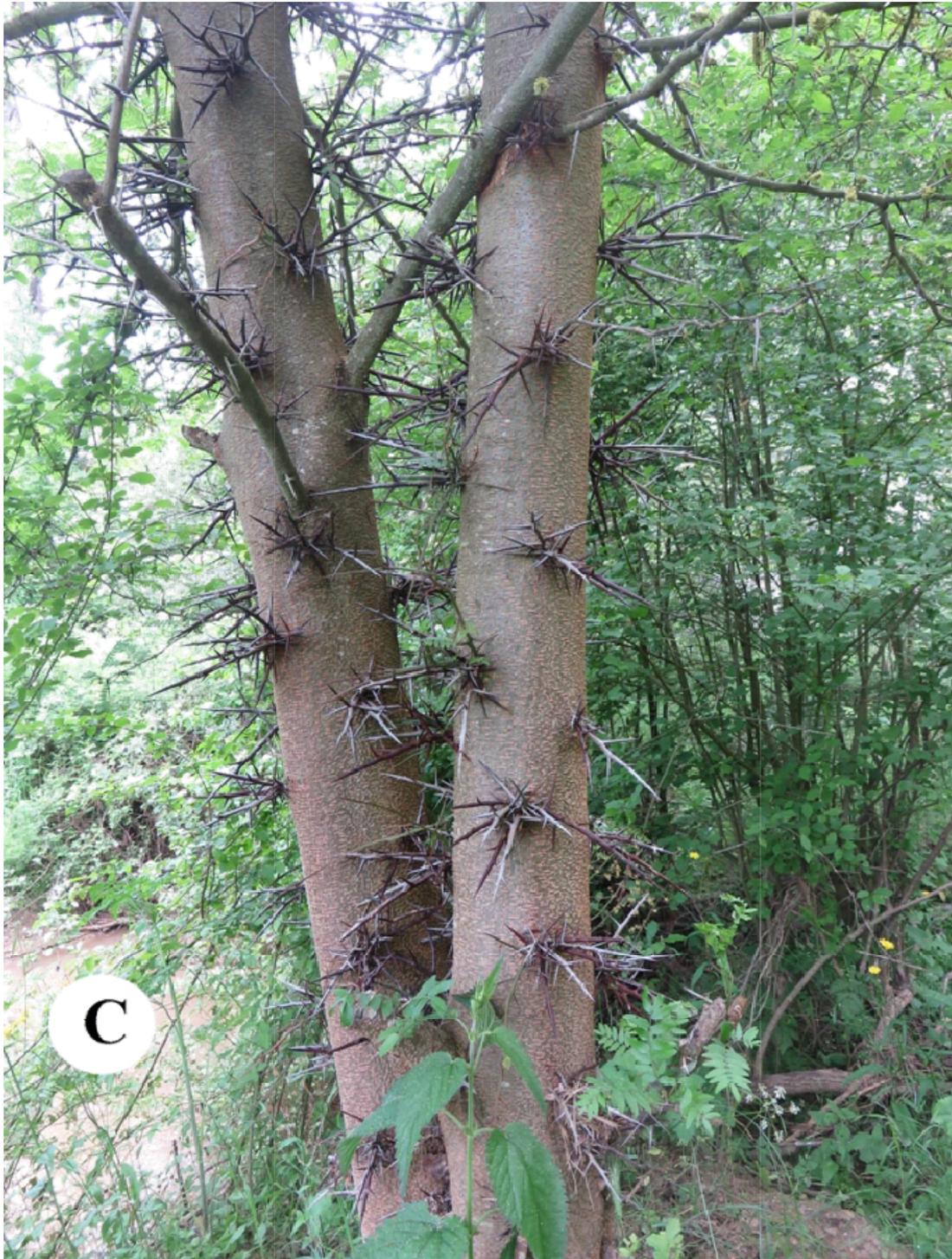
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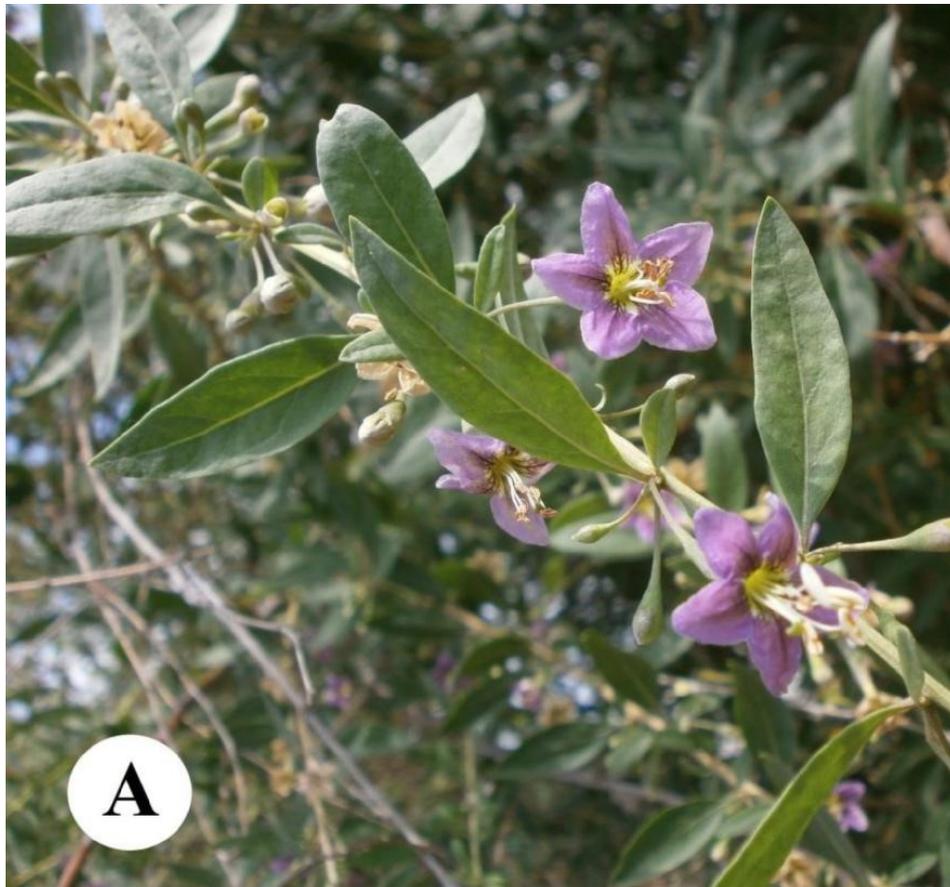
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**Interreg**



**BOARD5.** *Lycium barbarum*. **A.** Branches with leaves and flowers. **B.** Growing with merjan in the outskirts of the settlements.



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**BOARD 6.** *Parthenocissusquinquefolia*. Outcrops of rock habitats with a five-part garden vine.



**BOARD 7.** *Robinia pseudoacacia*. **A.** Inflorescence. **B.** Branches with leaves and spines. **C.** Fruits.



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**BOARD 8.** *Bidens frondosus*. **A.** Stem and leaves. **B.** Inflorescences.



**BOARD 9.** *Erigeron annuus*. **A.** Outbreaks of riparian meadows in the BeliLom valley. **B.** Inflorescences.



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**BOARD10.** *Phytolacca americana*. **A.** Leaves and unripe fruits. **B.** Ripe fruits.



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**BOARD 11.** *Symphotrichum novi-belgii*. **A.** Riparian habitat overgrowth. **B.** Leaves and inflorescences.



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