

TEXT OF THE MARSH EDUCATIONAL TRAIL (LÉTAVÉRTES)

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1 THE LANDSCAPE OF NYÍRSÉG AND THE FORMATION OF THE CRANE MARSH

THE FORMATION OF THE SANDHILLS OF THE NYÍRSÉG LANDSCAPE

Already in the Pliocene Epoch, 2.5-3 million years ago, the filling of the Carpathian Basin with river sediment began. And from the beginning of the Lower Pleistocene, rivers took over the main role in shaping the surface. At this time, the Tisza-Szamos riverbeds ran south-westwards through the Nyírség area. Over the centuries, the rivers flowing down from the mountains built up large areas of alluvial plain in the basin, and left the area after the land level rose, some 8 000 years ago. The valley they left behind is called the 'birch water valley'. After the landscape became flood-free, the cold-dry glacial climate could have triggered the wind-induced transformation of river sediment. This reworking was mainly carried out by working winds from the north-northeast, and the material was transported a few tens to hundreds of metres and then piled up in sand humps of various shapes. In the vicinity of the Crane Marsh, truncated western-stemmed parabolic humps and rim humps are particularly characteristic.

THE FORMATION OF THE CRANE BOG

The formation of the crane marsh was studied by natural geography and biology researchers at the University of Debrecen, mainly by excavating plant pollen deposited in the wet depressions over the last millennia. The bog is a remnant of the so-called "birch water valleys" that meandered along the glacial alluvial cone of rivers flowing down from the north-eastern Carpathians. Over the last 30 000 years, sand driven by strong northerly winds has contributed to the blockage of some valley sections during several periods of drier climate. The former birch water valleys had sections less affected by the natural dieback of the watercourse, such as the Crane Marsh here. The former living watercourse here took the form of a lake for a few thousand years. Later, it was transformed into a marsh by recharge and dense vegetation. As the water cover of the area has been highly variable over the last 50-100 years, marshland erosion has also started. However, conservation aims to maintain the valuable wetland character of the Crane Marsh.

2 VIEW FROM THE TOWER

From the observation tower, you can see a characteristic birch valley formed by the rivers running down from the Carpathian Mountains in the north-northeast. The rivers left this land eight thousand years ago. The valley's water supply from the rivers ceased and the landscape was transformed. The characteristic birch habitats were created.

The fringe hump opposite the observation tower is currently dominated by acacia plantations. However, before the acacia plantations, it was covered by scrub oak woodland interspersed with sand-steppe clearings. Nowadays, the steppe oak forest is the most endangered plant community in the Nyírség, with only a handful of sites remaining. Sandy pastures, which were created by deforestation, lie beyond the edge of the buffer strip.

Looking across the marsh, the reed bed habitat is clearly distinguishable, with the marsh bed at its deepest. There are few areas of uniform reed, with most areas of *Salix cinerea* interspersed with dense reed beds. Softwoods with fragile willows (*Salix fragilis*) are easily recognisable at the edge of the marsh, and in the northern part of the bed you can see the scrub clearings. To the east of the Crane Marsh, there are now arable fields. Prior to their cultivation, this area was covered by hardwood groves and boggy moorland.

3 REED BED

Reedbeds are plant communities found in temperate and subtropical zones of Eurasia, by stagnating and flowing waters, marshes and floodplains. They are characterized by the fact that their habitat is at least temporarily waterlogged. Their dominant plant is a tall grass, the reed (*Phragmites australis*), which can grow up to 4 m tall depending on the habitat. Its leaves are greyish green, flat and 15-30 cm long. The edges of the leaves are very sharp and can easily cut the hand of the unwary visitor. Flowers open in dark brown clusters 20-40 cm long. The plant grows a long, creeping rootstock underground and develops tendrils above ground, from which it produces new individuals, or clones, in suitable habitat. This is why we cannot tell from a reed how many individuals it has produced. The dense submerged tissue of weed stems and vines forms a dense living coating of various organisms over a large surface area, which plays an important role in water purification.

The flora of the reed beds is rather species-poor. Not many other plants survive in the dense stands of deep shade. They are also more likely to colonise the sparser areas or clearings. Typical flowering plants are the bright yellow-flowered water cattail (*Rorippa amphibia*) and the thick, hollow-stemmed water meadow grass (*Oenanthe aquatica*). Peat fern (*Thelypteris palustris*) and creeping nettle (*Urtica kioviensis*) also occur in marshy stands. A wide variety

of animals live on the substrate of the interlocking thatch trunks of the reed beds. These include nematodes, which can be very abundant, and leeches, which are also very fond of this habitat.

4 WILLOW-POPLAR GROVE

Willow-poplar groves, or softwood groves, prefer the water's edge. Their soil is saturated with water for several months each year. They are particularly fond of riverbanks, where they are flooded annually and can remain submerged for 3-4 months. The willows also develop roots on the lower part of their trunks during this period, adapting to the water cover. Before the water controls, flooding was a regular occurrence in the willow groves of the Crane Marsh, but nowadays only the soil is flooded. Typical trees are fragile willow (*Salix fragilis*) and white and grey poplar (*Populus alba*, *Populus canescens*).

Softwood forests are particularly rich in species, especially during the lush spring period. Many birds like to hide in their foliage. A typical singer is the Icterine warbler (*Hippolais icterina*), a small, gurgling bird. In their soft woods, small and large woodpeckers (*Dendrocopos minor*, *D. major*) forage for food and burrow in their trunks. Another distinctive bird is the berk cricket (*Locustella fluviatilis*), which has a voice more like that of a cicada. The protected small predatory mammal, European pine marten (*Martes martes*), is found in many areas. Insect species of value include the protected Natura 2000 candidate scarlet beetle (*Cucujus cinnaberinus*), whose larvae and the adult beetle itself live under the bark of fallen trees. A typical butterfly is the pale orange underwing (*Archiearis puella*), one of our earliest butterflies, appearing as early as the end of February. Its caterpillar is white, lives in summer.

5 TUSSOCK SEDGE COMMUNITY

Tussocks are plant columns that rise from the bog level and are formed by sedge species. These sedges do not have runners, which means that they do not creep away, but bring their leaves side by side year after year. Initially, they form a compact lawn 20-100 cm in diameter. Their leaves and stems die back every winter, and new shoots emerge from the axils of the leaves, a few mm higher than the previous year. In this way, over the years, the dead plant parts form a tussock. Three species of sedge-forming sedge occur in the Crane Marsh: the sedge-forming sedge (*Carex elata*), the protected fibrous sedge (*Carex*

appropinquata) and the protected Greater Tussock Sedge (*Carex paniculata*). The latter can reach a height of 1.5 metres and a width of 1 metre when old. In spring, after a period of rainfall, the shrubs are covered with water. At this time, only the upper part of the foliage emerges from the water. It is difficult to move around this habitat during this period, and dry feet are required to walk from bog to bog. The areas between the bulrushes are called semlyes. This special habitat is home to interesting plant species such as the Bogbean (*Menyanthes trifoliata*) and the marsh nettle (*Urtica kioviensis*). One of the greatest fauna values of the local heathland is the highly protected marsh lizard (*Zootoca vivipara*). It prefers to sunbathe on the shrubs emerging from the water, swimming skillfully when necessary. The protected Raft Spider (*Dolomedes fimbriatus*) moves easily on the surface of the water to ambush its prey. Females are up to 2 cm long, males are much smaller.

6 WILLOW FEN

Grassland wetlands are the most common type of wetland in our country. They start to form when the characteristic grey willow (*Salix cinerea*) bushes are planted in the shallow water of the recharging pools. Over time, they become more extensive and can overgrow the entire wetland, multiplying year after year. The willow bushes create a cool, humid microclimate by providing sun and wind shade, and are therefore home to many glacial remnant plants. In several places, the shrubs are interspersed with a dense carpet of lush green leaves of the protected marsh fern (*Thelypteris palustris*). In the clearings and along the edges, there are tall stands of purple small-reed (*Calamagrostis canescens*).

One of the most important insect species in the Kálló valley is the eastern marsh moth (*Arytrura musculus*). This species flies at night in late June and early July. Males and females mate at this time. The female lays her eggs on the mantelpiece and the caterpillars eat the grass. They pupate as summer approaches, and the adult moths emerge from the pupae in mid-June the following year. The protected yellow-legged tortoiseshell (*Nymphalis xanthomelas*) also feeds on the leaves of the grey (pussy) willow. It lays its eggs on branches bending over water.

7 REST AREA

LANDSCAPE FORMATION IN THE NYÍRSÉG

The last natural image of the Nyírség found here by the occupying Hungarians was a forest steppe interspersed with flat marshes, swamps and heaths, the dominant tree being oak. In the Middle Ages, this gave rise to a mosaic landscape of small villages, where the inhabitants cultivated meadows and pastures in the wooded, marshy and hilly areas, and small plots of land were used for arable farming. From the second half of the 19th century, the transformation of nature accelerated. From 1892 onwards, the so-called 'Birchwater Drainage Associations' built canals in the Nyírség district, collecting the water from the previously unrunnable flats and draining it into the Berettyó to make as many areas as possible suitable for cultivation. It was this activity that caused the destruction of most of the bogs in the Nyírség. To protect natural assets, it is necessary to mitigate the effects of landscape conversion. One of the most important tasks is to prevent land drying up. In order to achieve this, the Hortobágy National Park Directorate has used grant funding to build a water retention structure in the channel draining the Crane Marsh.

PRACTICAL NATURE CONSERVATION IN THE CRANE MARSH

The control of alien plant species is also very important. At the edge of the marsh, in the drier areas, American black locust (*Robinia pseudoacacia*) and late cherry (*Prunus serotinus*) have invaded several places. In the wetter habitats, American ash (*Fraxinus pennsylvanica*) is spreading, and the willows are covered with hedgehog vines (*Echinocystis lobata*). Nonnative plant species are controlled by both mechanical and chemical means.



Water retention structures are an essential tool for nature conservation



Late cherry eradication by bark ringing

<https://www.hnp.hu/hu/szervezeti-egyseg/turizmus/oldal/daru-lap-tanosveny>