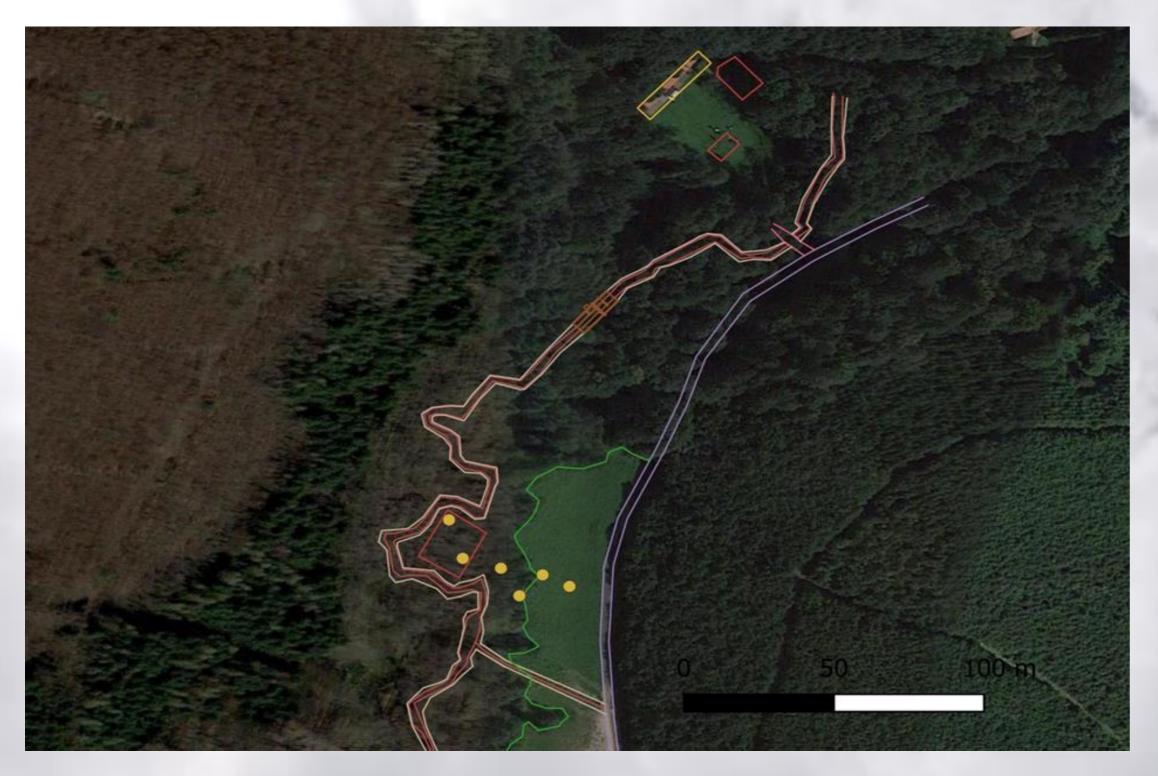
GROUNDWATER DEPENDENT FOREST AND WET MEADOW CHARACTERISTICS IN A CHANGING CLIMATE

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Eco-hydrology of hydrophyte forests and wet meadows are very important question in changing climate. Hydrological extremes can cause in these habitats droughts, intense rainfall events and floods. In this study, we investigated a riparian alder forest and its edge, and a neighbouring meadow in Hidegvíz Valley experimental catchment to compare different surface cover type hydrological and botanical characteristics. The research has conducted in 2018-2019 hydrological year.

Throughout the botanical study, a list has been made of the various plant species - trees, bushes, and herbs - of the elder woodland and its edge, and the grassland, in each vegetation period. The classifications of the habitats were made by the Á-NÉR system, which is a Hungarian classification system for Hungarian habitats. The hydrological research was focused on three important factors in the one-year period: precipitation, the changes of the groundwater levels, and the soil moisture values. We summarised the monthly data, and from all this, we calculated an annual water balance graph.

Figure 1: The sampling area in the Hidegvíz-valley experimental catchment. The brown line stands for the stream, the lilac is the road, the red one is the elder garden, and the green is the edge of the forest. Yellow dots are representing the places where we measured the soil moisture.

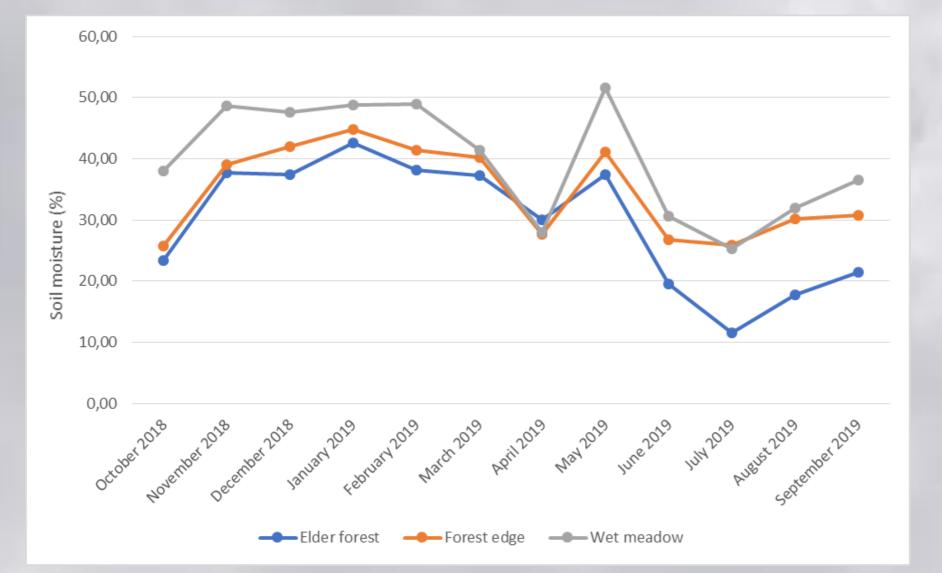
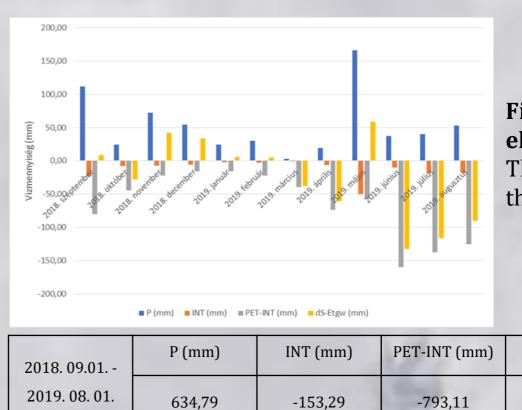


Figure 2: Soil moisture measured by the TDR instrument in the observed year

The water balance equation is:

P - INT - (PET - INT) = dS - ETgw

Where P is precitipation, INT is interception, PET is potential evapotranspiration, dS is change in the storage, ETgw is groundwater inflow. The PET-INT means the transpirantion water intake.



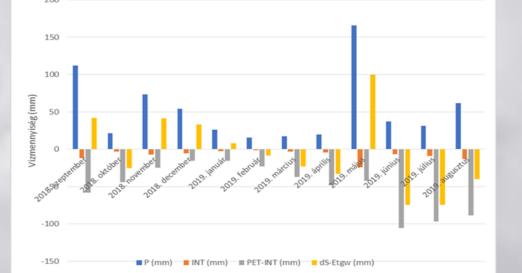


Figure 3: Water balance of the elder woodland during one year. The chart below the figure shows the monthly inflows and outflows.

dS-ETgw

-311,6

Figure 4: Water balance of the wet meadow during one year. The chart below the figure shows the monthly inflows and outflows.

2018. 09. 01	P (mm)	INT (mm)	PET-INT (mm)	dS-ETgw	
2019. 08. 01.	634,79	-91,5	-597,7	-54,41	

Plant species	A-D value	W value		Plant species	A-D value	W value	Plant species	A-D value	W value
	Canopy layer				Canopy layer			Herb layer	
Black alder (<i>Alnus</i> <i>glutinosa</i>) Sycamore (<i>Acer</i>	4	10		Black alder (Alnus glutinosa)	3	10	False oat-grass (Arrhenatherum elatius)	4	5
pseoudoplatanus)	+ Shrub layer	6		Sycamore (Acer pseoudoplatanus)	+	6	Horse mint (Mentha	4	7
Black elder (Sambucus nigra)	3	5			Shrub layer		longifolia) Parsnip (Pastinaca	4	6
Blackberry (<i>Rubus</i> spp.)	2	5		Black elder (Sambucus nigra)	3	5	sativa) Cow parsley	2	
Common spindle (Eounymus	1	5		Blackberry (Rubus spp.)	2	5	(Anthriscus sylvestris)	3	6
europaeus)	-			Common spindle			Wild carrot (<i>Daucus</i> carota)	3	2
Ivy (Hedera helix)	1 Herb layer	5	24	(Eounymus europaeus)	1	5	Orchard grass (Dactylis glomerata)	3	6
Ground elder (<i>Aegopodium</i>	4	7		Ivy (Hedera helix)	1	5	English ryegrass (Lolium perenne)	3	5
<i>podagraria)</i> Yellow archangel			-		Herb layer		Sheep's sorrel (Rumex acetosella)	2	5
(Galeobdolon luteum agg.)	4	6		Ground elder (<i>Aegopodium</i>	3	7	Cabbage thistle (Cirsium oleraceum)	2	7
Carex brizoides	4	6		podagraria)			Purple loosestrife (Lythrum salicaria)	1	9
Blackberry (Rubus spp.)	3	5		Yellow archangel (Galeobdolon luteum agg.)	3	6	Common yarrow (Achillea	1	2
Wood sorrel (Oxalis acetosella)	2	7	States and the second s	Common nettle (Urtica dioica)	3	5	millefolium) St John's wort		
ouch-me-not Balsam (Impatiens noli-	2	9	and the second second	Carex brizoides	2	6	(Hypericum perforatum)	+	3
tagere) Hedge woundwort (Stachys sylvatica)	1	6		Blackberry (Rubus spp.)	2	5	Sand leek (Allium scorodoprasum)	+	7

	anopy layer		
Black alder (Alnus glutinosa)	4	10	
Sycamore (Acer pseoudoplatanus)	+	6	
	Shrub layer		
Black elder (Sambucus nigra)	3	5	
Blackberry (Rubus spp.)	2	5	2
Common spindle (Eounymus europaeus)	1	5	14
Ivy (Hedera helix)	1	5	
	Herb layer		
Ground elder (Aegopodium podagraria)	4	7	
Yellow archangel (Galeobdolon luteum agg.)	4	6	
Carex brizoides	4	6	
Blackberry (Rubus spp.)	3	5	
Wood sorrel (<i>Oxalis</i> acetosella)	2	7	-
Touch-me-not Balsam (<i>Impatiens noli- tagere</i>)	2	9	No.
Hedge woundwort (Stachys sylvatica)	1	6	

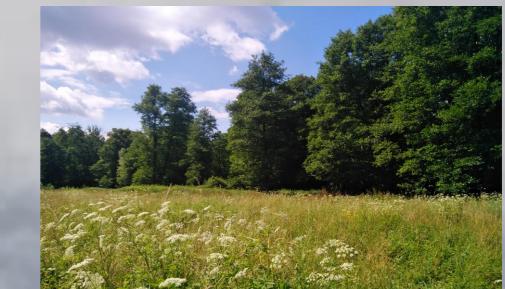
Chart 1: Typical plant species of the elder woodland. The A-D value stands for the cover, the W value is the wetness level that the named plant ecologycally prefers. The picture below the chart shows the elder woodland during the summer.



Chart 2: Typical plant species of the elder woodlands edge. The A-D value stands for the cover, the W value is the wetness level that the named plant ecologycally prefers. The picture below the chart shows the elder woodlands edge during the summer.



Chart 3: Typical plant species of the wet meadow. The A-D value stands for the cover, the W value is the wetness level that the named plant ecologycally prefers. The picture below the chart shows the elder wet meadow during the summer.







(i)

